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THE Physiological Basis OF ATHLETIC RECORDS.

Being the Presidential Address to the Section of Physiology of the British Association.

BY PROF. A. V. HILL, O.B.E., Sc.D., F.R.S.

IN the study of the physiology of muscular exercise there is a vast store of accurate information, hitherto almost unexploited, in the records of athletic sports and racing. The greatest efforts and the most intense care have been expended in making what are really experiments upon these subjects, and the results obtained represent what may justly be described as a collection of natural constants of muscular effort in the human race. It is the purpose of this address to discuss certain aspects of the data available in connexion with various forms of racing, and to see how far physiological principles at present known underlie them.

SOURCES OF INFORMATION.

The most complete set of records available, for a great variety of sports, is to be found in "The World's Almanac and Book of Facts," published by the *New York World*. Much of the information here presented was obtained from the 1925 edition of that work; similar but less extensive data can be found in our own Whitaker's Almanack. In addition, various books on horse-racing, on swimming, and on rowing have been searched for suitable material. I will not deal further with the statistical analysis of the facts, beyond referring to an extremely interesting and suggestive collection of them given in a paper by A. E. Kennelly, entitled An Approximate Law of Fatigue in the Speed of Racing Animals, published in the Proceedings of the American Academy of Arts and Sciences (vol. xlii., p. 275, 1906).

FATIGUE AS THE DETERMINING FACTOR.

An important and interesting problem for any young athlete is presented by the question "how fast can I run some given distance?" The maximum speed at which a given distance can be covered is known to vary largely with the distance. What are the factors determining the variation of speed with distance? How far, knowing a man's best times at two distances, can one interpolate between them for an intermediate distance, or extrapolate for a distance greater or less? Obviously the answer to such questions depends upon the factor which in general terms we designate fatigue. Fatigue, however, is a very indefinite and inexact expression; it is necessary to define it quantitatively before we can employ it in a quantitative discussion such as this. There are many varieties of fatigue, but of these only a few concern us now. There is that which results in a short time from extremely violent effort; there is the fatigue, which may be called exhaustion, which overcomes the body when an effort of more moderate intensity is continued for a long time. Both of these may be defined as muscular. Then there is the kind which we may describe as due to wear-and-tear of the body as a whole, to blisters, soreness, stiffness, nervous exhaustion, metabolic changes and disturbances, sleeplessness, and similar factors, which may affect an individual long before his muscular system has given out. Of these three forms of fatigue the first one only is as yet susceptible of exact measurement and description. The second type may quite possibly come within the range of experiment at no distant date. The third type is still so indefinite and complex that one cannot hope at present to define it accurately and to measure it. Undoubtedly, however, all these types of what we call "fatigue" influence—indeed, determine—the results which are to be presented.

PRESENTATION OF DATA.

The data will be exposed in graphical form, and in every case the quantities plotted are the speed as ordinate and the time, or some function of the time, as abscissa. The reason for taking the *time* occupied in a race as one of our variables is simple; the problem before us, physiologically speaking, is, clearly, *how long can a given effort be maintained?* The length of time is given by the abscissa as the independent variable; the magnitude of the effort, or some function of it, as represented by the speed (that is, by the average speed over the race considered), is given as ordinate. It will be shown below, as Kennelly indicated in his paper, that the ideal way to run a race, possibly not from the point of view of winning it, but certainly from that of breaking the record for the distance, is to run it at constant speed. In those performances which have attained to the dignity of a world's record it is unlikely that this criterion has been to any very large degree neglected. Apart, therefore, from the fact that there is no speed of which we have any record except the average speed, we are probably not far wrong in using the average speed as a fairly exact measure, or at any rate as a function of the effort involved.

In one case only (Fig. 4) the time occupied in the race has been given on a logarithmic scale; no great virtue attaches to the logarithm, but if 75 yards and 100 miles are to be shown on the same diagram in a readable form it is necessary somehow to condense the abscissæ at the longer times.

RUNNING AND SWIMMING: SHORTER TIMES.

In Fig. 1 all the important world's records are presented, average speed against time, for men and women running and for men and women swimming. The crosses representing men rowing in an 8-oar boat will be discussed later. It is obvious in all four cases that we are dealing with the same phenomena, a very high speed maintainable for short times, a speed rapidly decreasing as the time is increased and attaining practically a constant value after about 12 minutes. There are no reliable records, in the case of swimming, for times of less than about 50 seconds, so that the curves cannot be continued back as far as those for running. There can, however, be no doubt that the curves for running and swimming are essentially similar to one another and must depend upon the same factors. In running, starting inertia is the cause of the initial upward trend of the curves; a maximum average velocity is attained in the case of men for about 200 yards, of women for about 100 yards; after that a rapid decrease sets in, ending only when the time has become 10 or 15 minutes, the distance two to three miles. The phenomena shown in Fig. 1 are susceptible of a fairly exact discussion.

OXYGEN INTAKE, OXYGEN REQUIREMENT, AND OXYGEN DEBT.

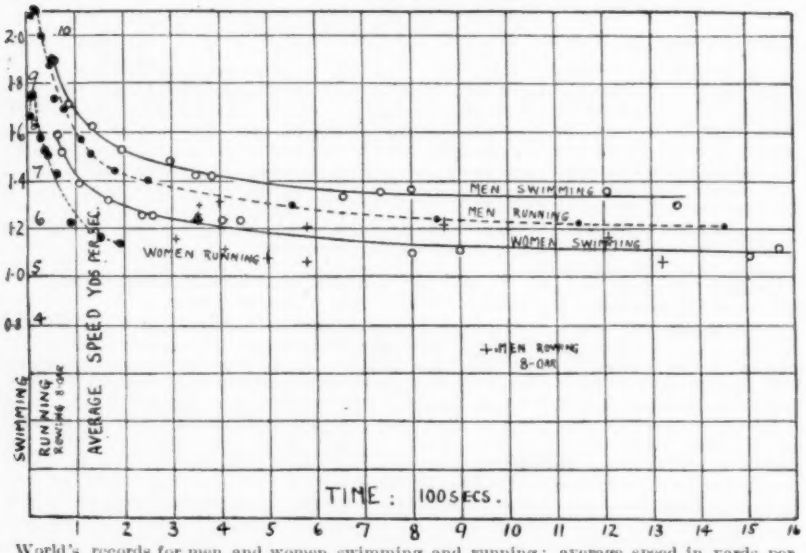
In recent papers my colleagues and I have tried to emphasise the importance of a clear distinction between the oxygen intake and the oxygen requirement of any given type and speed of muscular effort. When exercise commences, the oxygen intake rises from a low value characteristic of rest to a high value characteristic of the effort undertaken. This rise occupies a period of about two minutes; it is nearly complete in 90 seconds. The oxygen used by the body is a measure of the amount of energy expended. One litre of oxygen consumed means about five calories of energy liberated, enough to warm 5 litres of water one degree Centigrade—expressed in mechanical energy, enough to raise about one ton seven feet into the air. It has been established, however, that the oxygen need not necessarily be used during the exertion itself. The muscles have a mechanism, depending upon the formation of lactic acid in them, by which a large amount of the oxidation may be put off to a time after the exercise has ended. The recovery process, so called, is a sign of this delayed oxidation; it is just as important to the muscle as recharging to an electrical accumulator. The degree,

however, to which the body is able to run into debt for oxygen, to carry on not on present but on future supplies, is limited. When an oxygen debt of about 15 litres has been incurred the body becomes incapable of further effort; it is completely fatigued. In anything but the shortest races our record-breaking athlete should finish with something near a maximum oxygen debt, otherwise he has not employed all his available power, he has not done himself full justice. The maximum effort, therefore, which he can exert over a given interval depends upon the amount of energy available for him, upon (*a*) his maximum oxygen intake (that is, his income), and (*b*) his maximum oxygen debt (that is, the degree to which he is able to overdraw his account). These maxima are fairly well established for the case of athletic men of average size—about 4 litres per minute for the one, about 15 litres for the other.

It is possible for a man to make an effort far in excess of any contemporary supply of oxygen. This effort will require oxygen afterwards, and the total oxygen needed per minute to maintain the exercise can be measured. It is what we call the "oxygen requirement" characteristic of the effort involved. Now experiments have shown that the oxygen requirement varies very largely with the speed; it increases far more rapidly than the speed, more like the second or third power of the speed, so that high speeds and intense efforts are very wasteful. These facts enable us approximately to deduce the general form of Fig. 1.

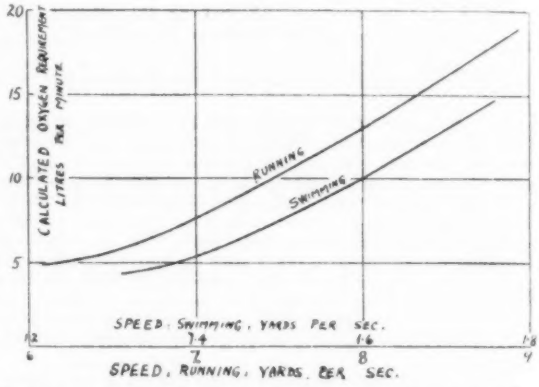
Imagine an athlete with a maximum oxygen intake of 4 litres per minute,[1] capable of running until his maximum oxygen debt has been incurred of 15 litres. If he runs for 15 minutes the total oxygen available during the exercise and in arrears is $15 \times 4 + 15 = 75$ litres; an effort can be made requiring 5 litres of oxygen per minute. Imagine, however, that he exhausts himself not in 15 but in 5 minutes; the total oxygen available during or in arrears is $5 \times 4 + 15 = 35$ litres. He may exert himself more violently, therefore, with an effort equivalent now to 7 litres per minute. Imagine next that he runs himself to exhaustion in 2 minutes: $4 \times 2 + 15$—i.e., 23 litres of oxygen are available, 11·5 per minute; a correspondingly greater effort can be made. By such calculations it is possible from Fig. 1 to deduce a relation between oxygen requirement and speed. Taking the case of a man swimming, the result is shown in Fig. 2 on the assumption of a maximum oxygen debt of 15 litres, a maximum oxygen intake of 3·5 litres per minute, and the supposition that at the end of the race the performer is completely exhausted. A similar calculated curve is given for the case of running, on the hypothesis of a maximum oxygen debt of 15 litres and a maximum oxygen intake of 4 litres per minute. There can be little doubt that the factors here described are the chief agents in determining the form of the curves given in Fig. 1.

FIG. 1.



World's records for men and women swimming and running; average speed in yards per second against time in seconds. *Note.*—The scale for swimming is five times as great as for running. The observations for men rowing an eight-oar boat are on the same scale as running and are referred to later in the text.

FIG. 2.



Oxygen requirement, running and swimming, of record-breaking athletes, calculated from curves of Fig. 1, on the assumption that at the end of a race the performer is completely exhausted, having attained his maximum oxygen debt. Maximum oxygen debt assumed = 15 litres for both. Maximum oxygen intake assumed: For running = 4 litres per minute; swimming = 3·5 litres per minute. Method of calculation described in the text.

LIMITS OF THE ARGUMENT.

It is obvious that we must not pursue the argument too far. A man cannot exhaust himself completely in a 100 or a 200 yards race; even 300 yards is not sufficient to cause an extreme degree of exhaustion, though a quarter-mile, in the case of a first-class sprinter, is enough, or almost enough, to produce complete inability to make any immediate further effort. We have found an oxygen debt of 10 litres even after a quarter-mile in 55 seconds. It is obvious, therefore, that we cannot pursue our argument below times of about 50 seconds, that the maximum speed is limited by quite other factors than the amount of energy available. It is not possible in any way to release energy explosively for very short intervals of effort; other factors determine the maximum speed, factors mechanical and nervous. Neither can the argument be applied to very long

[1] Assumed, for the sake of simplicity in calculation, to commence as soon as the race begins. For a more accurate calculation the gradual rise of the oxygen intake at the beginning of exercise can be taken into account.

races, where—as we shall see below—other types of exhaustion set in.

COMPARISON OF MEN AND WOMEN: SWIMMING AND RUNNING.

There are certain characteristics of these curves which are of interest. In the first place those for men and women are almost precisely similar. For a given time of swimming the maximum speed for a woman appears throughout the curves to be almost exactly 84 to 85 per cent. of that for a man. The curve relating oxygen requirement to speed, in the case of swimming, is not known from experiment, nor are the maximum oxygen debts and the maximum oxygen intakes known for women with any certainty. It would be very interesting to determine them were volunteers forthcoming. If we assume what is roughly true, that the energy expenditure rises approximately as the square of the speed, we may conclude that a woman swimming is able to exert, per kilogramme of body-weight, about 72 per cent. of the power expended by a man. Women are well adapted to swimming; their skill in swimming is presumably just as great as that of men; the difference in the maximum speed for any given time can be a matter only of the amount of power available.

In running, the same type of comparison may be made, though here not over the same range of times. For anything but the shortest races the maximum speed of a woman is almost precisely 79 per cent. of that of a man running for the same time. For very short times, 5 to 10 seconds, the ratio is greater—namely, 84 per cent. Here, again, there would seem little reason to attribute the difference of speed, at any rate for the longer races, to anything but a difference in the maximum amount of power expendible over the period in question. Assuming again, as an approximate means of calculation, that the energy used per minute varies as the square of the speed, we see that a woman running is able to liberate in a given time only about 62 per cent. of the energy expendible by a man of the same weight. It is probable that this ratio between men and women, as determined by swimming and by running respectively, is really the same in either case, and that the apparent difference depends upon an inexactness in the simple laws we have assumed for the variation of energy expended with speed. It would seem fair to take the mean of these two values, 67 per cent.—that is, about two-thirds—as the ratio of the amount of energy expendible by a woman in a given time as compared with that by a man of the same weight. It would be of great interest—and quite simple—to test this deduction by direct experiment on women athletes.

MEN AND WOMEN JUMPING.

A further interesting comparison between men and women may be found in the records of high jumps and long jumps. The world's record long jump for a man is 25·5 feet, for a woman 16·9 feet. The high jump records are respectively 6·61 feet and 5 feet. At first sight, when compared with running, these records for women seem extraordinarily poor; the high jump is only 75·5 per cent., the long jump only 66 per cent., of that for men. Such a conclusion, however, rests upon a misunderstanding, almost like that which makes many people believe that if a man could jump as well as a flea he could easily clear the top of St. Paul's Cathedral. It is a matter only of elementary mechanics to show, on the assumption that a woman can project herself vertically with a velocity proportional to that with which she can project herself horizontally, the constant of the proportion being the same as for the case of a man, that both the high jump and the long jump in the two sexes should be in the ratio *not of the velocities but of the squares of the velocities*. The maximum range and the maximum height of a projectile vary as the square of the velocity of projection. Thus it is right to compare, for men and women, not the height of the high jump or the distance of the long jump, but the square roots of these quantities, if we wish to study their relative performance in jumping as compared with running. This being so, we find that the high jump of a woman, as measured by its square root, is 87 per cent. of that of a man[2]; the long jump, measured in a similar way, is 81·5 per cent. These compare closely with their relative performances for very short times of running, where a woman, as shown above, can run 84 per cent. as fast as a man. It is amusing to find simple mechanics explaining such apparent differences between the sexes.

SKILL.

Some people are much more skilled than others. To a large degree, of course, the skill and grace associated with athletic prowess is natural and inborn; to a large degree, however, it can be produced by training and breeding. All the movements required in the violent forms of muscular exertion here discussed are rapid ones, far too rapid to be directly and continuously subject to the conscious intelligence; they are largely, indeed mainly, reflex, set going by the will but maintained by the interplay of proprioceptive nervous system and motor apparatus. The nature of muscular skill cannot be discussed here; possibly, however, above all other factors it is the foundation of athletic prowess. Such skill has a physiological basis as it has a psychological aspect. It is a fit subject for discussion alike by physiologists, psychologists, students of physical training, athletes, masters, and workmen. The further study of skill is likely to be most fruitful in many branches of human endeavour. Given incorrect adjustment due to lack of skill, given imperfect timing of the several parts of the mechanism, given unnecessary movement and vibration, the whole system will be inefficient. Fundamentally the teaching of athletics for anything but the shortest distances consists in training the performer to carry out the same movements at a given speed for a smaller expenditure of energy.

BICYCLING AND HORSE-RUNNING.

Not all forms of muscular exertion are so violent, involve so great an expenditure of energy, when carried out at the highest speed, as running and swimming. In Fig. 3 are two examples of this fact, horse-running and bicycling. For horse-running a long succession of records on American horses are plotted on the topmost curve; below are the records of men bicycling, the unpaced professional records, made not in a race but against time. Most bicycle races are useless for our purpose. The competitors proceed in groups, trying one to ride behind the other to avoid wind resistance, and the speed may be absurdly low. Paced records are of little value because the efficiency of the wind-screen provided by the pacing apparatus is not standardised. These professional records, however, made unpaced, simply with the intention of breaking the record, are probably reliable, and they form a reasonably smooth curve. Plotted on the same diagram for comparison is a curve to represent a man running, a replica of that of Fig. 1. The first two curves are on twice the scale of the third, since a running horse and a bicycling man can go about twice the speed of a running man. It is obvious at once that neither of these two curves falls anything like so rapidly as does that of a running man; fatigue does not so soon set in; the amount of energy expended at the highest speed must be much less than in a running man. This conclusion, indeed, is obvious to anyone who has tried to ride a bicycle fast. It is impossible to exhaust oneself rapidly on a bicycle; the movements are too slow, they involve too little of the musculature of the body; it would require some minutes to produce by bicycling a state of exhaustion easily attainable within a minute by running. The curve for horse-running is almost parallel to that for bicycling; presumably, therefore, the movements of a horse are so arranged that the extreme violence of effort possible in a human "sprinter" is unattainable. Possibly the

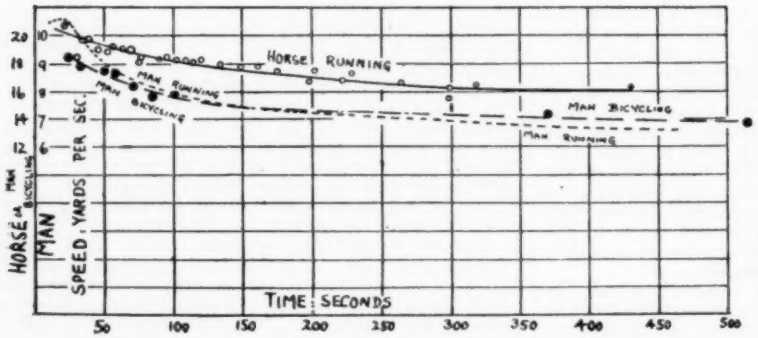
[2] It would really be fairer to compare the heights jumped, less the initial heights of the centres of gravity, say 3·1 feet and 2·8 feet respectively. This gives 2·2/3·51 = 0·63 as the ratio of the heights, of which the square root is 0·79, a close agreement with the long jump.

movements are too infrequent, or the qualities of the horse's muscles are so different, that the kind of fatigue rapidly attainable in man is not possible in the horse; possibly the horse will not "run himself out" so completely as a man.

BICYCLE ERGOMETERS.

The curves of Fig. 3 are of interest in connexion with the numberless experiments which have been made with bicycle ergometers. Nearly all the laboratory observations on man, in connexion with muscular exercise, have been made with that implement. It has been obvious to my colleagues and myself during the last few years that the types of exercise chiefly adopted by us, running and standing-running, are more exhausting and require a far greater expenditure of energy than those employing the bicycle ergometer. In rowing and in pedalling a bicycle it may not be possible to attain respiratory quotients of 2 or more during or shortly after exercise. After running, or standing-running, however, very high values are attained, due to the fact that these latter forms of exercise, at the highest speeds, are so very much more energetic than the slower movements of rowing or bicycling. It is speed and frequency of movement which determine the degree of exhaustion produced by it. To exert a powerful force in a moderate rhythm is not anything like so tiring as to exert a much smaller force in a frequent rhythm; hence the reason for "gearing up," as in the bicycle and in the long oars of a rowing-boat.

FIG. 3.



Records for horse running and man bicycling; dotted curve for comparison, man running, taken from Fig. 1. Horizontally, time in seconds; vertically, average speed yards per second. *Note.*—The horse and the man bicycling are shown on half the scale of the man running. The records for bicycling are the unpaced professional records against time. The records for horses were made in America.

[After a further illustration from English horse racing the lecturer proceeded to a consideration of the last diagram, Fig. 4.]

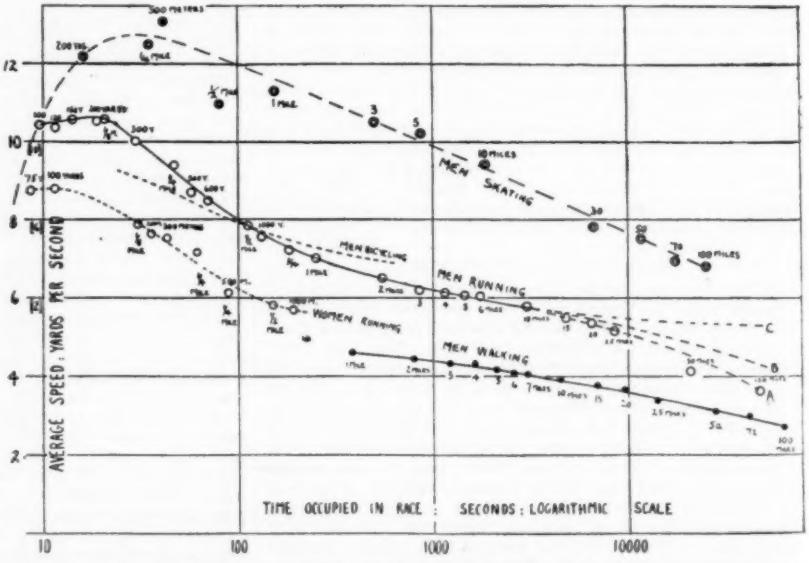
THE LOGARITHMIC GRAPH.

There average speed in a race is plotted against the logarithm of the time occupied in it, the logarithm being employed, as stated above, for the purpose of including all records from 75 yards to 100 miles in the same picture. That people think, to some degree, in logarithms, although unconsciously, is shown by the fact that the records which men have thought it worth while to make are distributed approximately uniformly over the picture from left to right. Fig. 4 presents the data of athletics perhaps more clearly than any other. The initial rise of the curve for men running, which is due to starting inertia, is very obvious. The rapid fall beyond 220 yards is clearly seen. It is obvious that the 100 and the 220 yards (¼ mile) records are better than those lying in their neighbourhood, that the quarter-mile record is extremely good, the 500 yards record very bad, by comparison with its neighbours. This diagram should enable any enterprising and scientific athlete to select the records most easy to break. Let him try those for 120 yards, for 500 yards, for three-quarter mile, for three miles, but not for 200 yards, quarter mile, one mile, and six miles.

LONG-DISTANCE RECORDS.

In Fig. 1 we saw that the speed fell to what seemed to be practically a constant level towards the right of the diagram; this fall represents the initial factor in fatigue. On the logarithmic scale, however, where the longer times are compressed together, the curve continues to fall throughout its length. This later fall is due to factors quite different from those discussed above. Consideration merely of oxygen intake and oxygen debt will not suffice to explain the continued fall of the curve. Actually the curve beyond 10 miles seems to some degree doubtful. Apparently the same extent of effort has not been lavished on the longer

FIG. 4.



Records for men skating, bicycling, running, and walking, and for women running. Horizontally, logarithm of time occupied in race; vertically, average speed in yards per second. The same scale is used throughout, except for bicycling, where half the scale is employed, as shown in square brackets. The curve for men running appears to be somewhat doubtful beyond 10 or 15 miles, and three alternative curves are shown by broken lines.

records. The greatest athletes have confined themselves to distances not greater than 10 miles. The curve A drawn through all the points has a suspicious downward bend in it, which suggests that if Alfred Shrubb or Nurmi had tried to break the longer records they would have done so very effectively. Possibly the true curve lies more like the continuation C; possibly it may be intermediate as shown at B. It would seem doubtful, indeed, whether the running curve and the walking curve are really to meet at about 150 miles. The most probable continuation of the running curve would seem to be somewhere between the lines B and C.

The continued fall in the curve, as the effort is prolonged, is probably due to the second and third types of fatigue which we discussed above, either to the exhaustion of the material of the muscle, or to the incidental disturbances which may make a man stop before his muscular system has reached its limit. A man of average size running in a race must expend about 300 g. of glycogen per hour; perhaps a half of this may be replaced by its equivalent of fat. After a very few hours, therefore, the whole glycogen supply of his body will be exhausted. The body, however, does not readily use fat alone as a source of energy; disturbances may arise in the metabolism; it will be necessary to feed a man with carbohydrate as the effort continues. Such feeding will be followed by digestion; disturbances of digestion may occur—other reactions may ensue. For very long distances the case is far more complex than for the shorter ones, and although, no doubt, the physiological principles can be ascertained, we do not know enough about them yet to be able further to analyse the curves.

WOMEN'S RUNNING RECORDS.

The women's curve, as far as it goes, is very similar to the men's. Some records again are better than others. An enterprising woman athlete who wants to break a record should avoid the 300 metres; she would be well advised to try the 500 metres. It would be very interesting to have an intermediate point between 100 and 200 yards.

BICYCLING AND WALKING.

As before, the curve for men bicycling, which is drawn on twice the scale vertically of the running curves, is far less steep than they are. The conclusion from this was emphasised above. The walking curve is interesting—it is approximately straight. Physiologically speaking, there is not much interest in the shortest walking races, since here walking is artificial and extremely laborious; running at a considerably higher speed is much more easy. For longer distances, however, say from 10 miles onwards, we have probably in walking the most reliable data available for long-continued muscular effort. If we wish to study the exhaustion produced by exercise of long duration, walking-men may well provide the best subjects for our experiments.

SKATING.

There remains the top curve of all, that for men skating. The initial rise of the curve, due to starting inertia, is very obvious. The fall of the curve beyond the maximum is nowhere near so rapid as for the case of running. Clearly in skating a man is not able to exert himself with the degree of ardour that is possible in the more primitive exercise of running. Skill and restraint are necessary, as they are in bicycling. There are limits to the output. Moreover, the effort can be continued for a long time at comparatively high speeds. It is interesting to note that a man can skate 100 miles at almost the same speed as another man can run one mile. The curve falls uniformly throughout as does the walking curve. Clearly the phenomena of gradual exhaustion could be well investigated in the case of skating. Here, again, it is obvious which records the aspiring athlete should attempt to break.

ROWING.

There are only a few records available, and those lying between rather narrow limits, for the case of rowing. Taking the case of an eight-oar boat, I have been able to obtain very few reliable data. Kennelly gives records of crews rowing, for times from 305 to 1210 seconds. Yandell Henderson, in the *American Journal of Physiology* (vol. lxxii., p. 264, 1925), gives five observations made upon the Yale crew of 1924. In addition there are records for the Henley course; these, however, are usually contaminated by the speed of the water. The most reliable of the data have been plotted in Fig. 1 on the same scale as the running, on five times the scale of the swimming. The observed points, shown by crosses, are somewhat scattered. As far as they go, a mean curve through them would lie practically along the curve for women swimming, but, of course, on five times the scale. The interesting part of the curve to the left is lacking; it is obviously impossible to make observations on an eight-oar boat for periods of 20 seconds, starting inertia is too great and no result of any value could be obtained. It would, however, be of interest to obtain data as far back as possible; certainly the records of crews rowing in still water for a minute and above should be ascertainable, and they would help to fit rowing into the scheme outlined by the other types of muscular effort.

WORK AND STROKE FREQUENCY IN ROWING.

In rowing the movements are slow; in an eight-oar boat, from 30 to 40 strokes per minute. According to observations by Lupton and myself the maximum efficiency of human muscular movement is obtained at speeds of about one maximal movement per second. In rowing, experience and tradition alike suggest that such a speed is about the optimum. In an eight-oar boat the recovery takes almost as long as the stroke, both occupying about one second. It is of interest how practical experience has gradually evolved a speed of movement which is almost exactly what a physiologist might have predicted as the most efficient. At a stroke of about 32 per minute the mechanical efficiency is apparently near its maximum. An enormous amount of work has to be done in propelling a boat at speeds like 10 to 12 miles per hour. According to Henderson, each member of the crew of an eight-oar boat must exert about 0·6 of a horse-power. Clearly if this enormous amount of external work is to be done it must be accomplished by working under efficient conditions. Those conditions necessitate a stroke of a particular frequency; only when the race is very short is it permissible, in order to obtain a greater output, to work less efficiently by adopting a more rapid stroke. The stroke may rise to 40 per minute for a short distance; in such an effort the oxygen debt is accumulating rapidly and exhaustion will soon set in. The amount of work, moreover, will not be proportionately greater, probably only slightly greater, than at the lower frequency. The conditions which determine the speed of movement, the "viscous-elastic" properties of muscle, are what ultimately decide the length of the oars and the speed of movement in a racing-boat. It is interesting to find—as, of course, was really obvious—how closely athletics is mixed with physiology.

WASTEFULNESS OF HIGH SPEEDS.

This last discussion leads us to the question of what determines the great wastefulness of the higher speeds. Why does a speed of 280 steps per minute require 24 litres of oxygen per minute, while a speed of 240 steps per minute requires only eight litres of oxygen? The answer depends upon the variation of external work with speed of muscular movement. In a series of recent papers it has been shown that in a maximal muscular movement the external work decreases in a linear manner as the speed of shortening increases. At sufficiently high speeds of shortening no external work at all can be performed. In most of these athletic exercises, apart from the case of rowing, a large proportion of the mechanical work is used in overcoming the viscous resistance of the muscles themselves. At high speeds of running only a small

fraction of the mechanical energy of the muscles is available to propel the body once the initial inertia has been overcome. The speed of shortening is so rapid that little external work can be done. The work is absorbed by internal friction, or by those molecular changes which, when the muscle is shortening rapidly, cause its tension to fall off. When working against an external resistance, as in rowing, there is an optimum speed. If an effort is to be long continued it must be made at a speed not far from the optimum. When, however, the whole of the resistance to movement is internal, as in running, there is no optimum speed; the expense of the movement increases continually as the speed goes up; the faster we move, the greater relatively the price. Our footsteps are dogged by the viscous-elastic properties of muscle, which prevent us from moving too fast, which save us from breaking ourselves while we are attempting to break a record.

UNIFORM SPEED IS THE OPTIMUM.

The amount of energy required per minute to run or to swim, or, indeed, to propel oneself in any way, increases more rapidly than the speed—in the cases which have been investigated, approximately as the square of the speed. This mathematical relation is not exact. From the variation of energy output as the square of the speed, we can immediately deduce that the most efficient way in which to run a race is that of a uniform speed throughout. Imagine that a man runs a mile race in 4 minutes 30 seconds at a uniform speed of 6·52 yards per second. His energy expenditure is proportional to $4\frac{1}{2}$ times 6·52 squared—that is, 191·3 expressed in some arbitrary units. Imagine now that he runs it at two speeds, 6 and 7 yards per second, 780 yards at the lower, 980 at the upper speed. The total time is the same; the energy expended, however, is slightly greater, 192·3 instead of 191·3. This small variation of speed in the race has produced no serious increase in the energy expenditure. Let us imagine, however, that one portion of the race, 665 yards, is run at 5 yards per second, while another portion, 1096 yards, is run at 8 yards per second. The total time occupied in the race is still 4 minutes 30 seconds. The energy expended, however, is greater—namely, 201·5 units. Even this, however, is not a very large increase; by running about half the time at 8 yards and half the time at 5 yards per second, the energy expended has been increased only about 5 per cent., as compared with that required for running at a uniform speed of 6·5 yards per second throughout. Although, therefore, theoretically speaking, the optimum fashion in which to run a race is that of uniform velocity throughout, comparatively large variations on either side of this velocity do not appreciably increase the amount of energy expended.

POSSIBLE ADVANTAGES OF A FAST START.

There may, indeed, be advantages in starting rather faster than the average speed which it is intended to maintain. The sooner the respiration and circulation are driven up to their maximum values the greater will be the amount of oxygen taken in by the body, the greater the amount expendible during the race. It is a common practice in mile races to start very fast and to settle down later to the uniform speed. This may have a physiological basis in the quickening up of circulation and respiration achieved thereby.

THE SIMPLE MECHANICS OF HIGH-JUMPING.

One final point may be worthy of mention—this time connected with high-jumping and long-jumping. Recently I made a series of observations, with a stop-watch reading to 0·02 seconds, of the times occupied by a number of high-jumpers from the moment they left the ground to the moment they reached the ground again. With men jumping about 5 feet the time averaged about 0·80 second. Calculating from the formula

$$S = \tfrac{1}{2}gt^2,$$

where t is half the total time of flight, the distance through which the centre of gravity of the body was raised must have been about 2·5 feet. The men competing must have had an original height of their centre of gravity of about 2·7 feet. Thus, in the high-jump, their centres of gravity went about 5·2 feet high into the air. They cleared a height of 5 feet; they just managed to wriggle their centres over the bar. Now, paradoxical as it may seem, it is possible for an object to pass over a bar while its centre of gravity passes beneath; every particle in the object may go over the bar and yet the whole time its centre of gravity may be below. A rope running over a pulley and falling the other side is an obvious example. It is conceivable that by suitable contortions the more accomplished high-jumpers may clear the bar without getting their centres of gravity above or appreciably above it. Let us calculate, however, on the assumption that the centre of gravity of a jumper just clears the bar. The world's record high-jump is 6·61 feet, the centre of gravity of the performer being presumably about 3 feet high at rest. He raises it therefore 3·61 feet into the air, from which we may calculate that the whole time occupied in the jump is about 0·96 second. Seeing the amazing complexity of and the skill involved in the rapid movements and adjustments involved in a record high-jump, it is striking that all those events can occur within a time of less than one second. All the characteristics of the proprioceptive system must be evoked in their highest degree in carrying out such a skilled, rapid, and yet violent movement.

LONG-JUMPING.

It is well known to athletes that success in long-jumping consists in learning to jump high. It is not, of course, the case that a record long-jumper performs at the same moment a record high-jump. He must, however, cover a very considerable height. The world's record long-jump is 25·48 feet. With the check provided by the vertical impulse in the last step we cannot well imagine the horizontal velocity to be greater, at this moment, than that of 100 yards completed in 10 seconds—that is, than 30 feet per second. Let us assume this value. Then the performer remains in the air for $\frac{25{\cdot}48}{30}$, that is, 0·85 second. Hence we may calculate that the vertical distance covered is about 2·9 feet. Assuming the centre of gravity of the subject to have been originally 3 feet high, this means that it must have reached a height 5·9 feet in the air, enough, in a high-jump, to enable its owner to clear 5·9 feet. It is interesting to find that the simple laws of mechanics emphasise so strongly the precepts of the athletic trainer. Not only must one jump high if one wishes to break a long-jump record, but one must bring one's centre of gravity nearly 6 feet high into the air; for one must project oneself vertically, so that one may remain for 0·85 second above the ground.

CONCLUSION.

The practice of athletics is both a science and an art, and, just as art and science are the most potent ties tending to draw men together in a world of industrial competition, so sport and athletics, by urging men to friendly rivalry, may help to avert the bitterness resulting from less peaceful struggles. If, therefore, physiology can aid in the development of athletics as a science and an art, I think it will deserve well of mankind. As in all these things, however, the reward will be reciprocal. Obviously in the data of athletic records we have a store of information available for physiological study. Apart from its usefulness, however, I would urge that the study is amusing. Most people are interested, at any rate in England and America, in some type of sport. If they can be made to find it more interesting, as I have found it, by a scientific contemplation of the things which every sportsman knows, then that extra interest is its own defence.

SOME

Practical Considerations

IN THE CONSERVATIVE TREATMENT OF

FRACTURES OF THE PELVIS AND LOWER EXTREMITY.*

A Course of Four Lectures delivered for the University of London at St. Bartholomew's Hospital

BY SIR WILLIAM I. DE COURCY WHEELER,
M.D. DUB., F.R.C.S. IREL.,
PAST PRESIDENT, ROYAL COLLEGE OF SURGEONS IN IRELAND.

LECTURE III.*

FRACTURES ABOUT THE KNEE-JOINT.

FRACTURES of the lower end of the femur into the knee-joint are not uncommon. They resemble closely articular fractures of the lower end of the humerus. The condyles may be comminuted, or there may be simple fractures through either condyle. Replacement of the fragments usually takes place under extension. A Thomas knee-splint, applied in the classical fashion, is the best apparatus for the purpose. Traction on the tibia pulls the condyles into correct position by the tension of the lateral and crucial ligaments. By separating the joint surfaces during treatment adhesions are prevented and early movements facilitated. Stretching of the ligaments during treatment does not produce any permanent disability.

It is best for the surgeon to manipulate the condyles with his hands while the assistant is applying extension in these cases. "So long as the tibia is not allowed to bump up against them," says Sir Robert Jones, "they will not be again displaced. If immediate reduction does not occur, quite often after a 12 hours' extension on the Thomas splint the displaced fragment will find its proper position." Fractures of the tuberosities of the tibia and T-shaped fractures into the joint are dealt with in the same way. About six weeks after these injuries the patient may move about on a calliper splint.

Epiphyseal Separation.

The lower fragment is usually displaced forwards, and the ragged end of the upper fragment is pushed backwards in relation to the popliteal vessels. The injury is sometimes compound, and in many recorded cases amputation has become necessary.

Reduction is accomplished by strong flexion until the heel touches the buttock, combined with traction on the tibia and direct manipulation. In order to save the limb open reduction may become necessary. Union usually takes place by bone, and is followed by some shortening and interference with growth. The injury should be treated in full flexion, as in similar fractures involving the elbow-joint. In the latter case the triceps, with the limb in flexion, provides a nicely grooved natural splint for the prevention of backward displacement and, in the case of the knee-joint, the quadriceps extensor when the limb is flexed forms a naturally moulded anterior splint which admirably controls the fragments and prevents forward displacement.

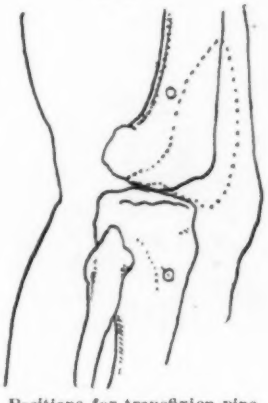
In epiphyseal separation of the lower end of the femur the limb, after reduction, should be carefully watched lest anything in the nature of tight bandaging or tight compression produces swelling of the feet. The condition of the circulation in children, when firm fixation is required, needs strict attention. "Look well to the blood-supply of the limb below the point of injury, more especially in *all* fractures of the lower extremity," is the advice of Bryant and Buck in the "American Practice of Surgery" (Vol. III.).

Traction by Pins, Callipers, and Stirrups.

Before dealing with the treatment of mal-union and non-union after fracture of the femur, it is necessary to refer to the question of extension applied by means of metal appliances attached to, or passed through, the bone. These appliances consist of various pins, callipers, and stirrups; each surgeon has his preference for one or the other. The transfixion pin is the only one I myself employ, and quite often it takes the form of a long nail, such as is used for the temporary fixation of joints after excision. The skin is pulled upwards towards the hip to prevent subsequent traction pressure on the skin below the pin. The point of election for transfixion is just above the condyles at their junction with the shaft. If a pin is driven through the compact tissue of the femur at the point indicated, it can be left in place without inconvenience or pain for from six to eight weeks. A handle improvised from wire is attached to the pin. In the cases I have treated I have passed the pin through the tibia, not the femur. It is passed through the shaft of the tibia just behind and below the tubercle. In this position the bone is thick and hard, and the pin can be left in position for two or three months (Fig. 1).

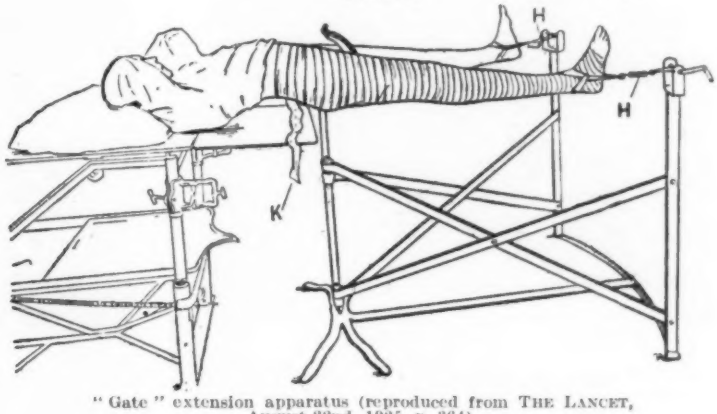
In the case of fractures of both bones of the leg, when this form of extension becomes necessary, the pin is passed by some surgeons above, but in the line of, the malleoli, well clear of the ankle-joint, about three finger breadths above the tip of the external malleolus. Personally, I prefer transfixion of the

FIG. 1.



Positions for transfixion-pins. (Hey Groves.)

FIG. 1A.



"Gate" extension apparatus (reproduced from THE LANCET, August 22nd, 1925, p. 364).

* Lectures I. and II. appeared in THE LANCET of August 15th and 22nd respectively, and Lecture IV. will appear in a subsequent issue.

os calcis. The pin is passed one inch below and behind the tip of the external malleolus, downwards and inwards in such a way that traction produces inversion of the foot.

Full information on this subject is to be found in the excellent work on "Modern Methods of Treating Fractures," by Hey Groves.

FIG. 2.

Mal-union of femur (lower third) three months after the injury. 3½ inches shortening. (Lateral view.)

MAL-UNION AND NON-UNION.

Mal-union and non-union are due, probably in 90 per cent. of cases, to mal-treatment. They are a reproach to surgery, and can always be avoided. It is no use blaming constitutional disease, or the interposition of soft tissues between the fragments for these unpleasant sequelæ. The primary treatment is practically always at fault, and is thus the main causative factor. The primary treatment may be good, but if the patient is allowed to bear weight too early, yielding of the callus with angulation and overlapping will take place.

The time of strong union in a fractured bone varies in almost every case, and the length of time given for solid union in the text-books never errs on the safe side. In a small percentage of cases twice as much time is required as in a typical case. To allow walking without a calliper splint in the case of a fractured femur before three months have elapsed is asking for trouble, and under certain conditions a much longer period is required. Cases of non-union are often unrecognised cases of delayed union, and the dividing line between the two is very obscure. For some reason or another union is slow, and at the end of five or six weeks the surgeon becomes anxious, and moves the fragments one upon the other; in another four or five days he tries again, and, by a continuation of this process, it is made impossible for the slowly-forming permanent callus to complete the union.

The treatment of definitely ununited fractures must, of course, be operative, but the surgeon should feel morally certain that it is a case of non-union, and not delayed union, before operation is undertaken. In this matter I have tried to follow the teaching of Sir Robert Jones. His usual practice is simply to begin again and wait, and to try and induce osteogenetic activity by Thomas's so-called "percussion and dam" method. After hammering the whole region of the fracture with a padded or indiarubber mallet, a tight elastic band is applied both above and below the fracture at a distance of several inches. The limb between the tubes swells to much more than its normal girth, expanding all the capillaries and lymph paths in the fibrous tissue, and allowing a new process of repair to start. The indolent callus may thus be transformed into an osteogenetic factory. The rubber tubes can be worn only for about 20 minutes each day at first; afterwards they can be borne for several hours at a time. They should be kept tied sufficiently tightly to produce considerable swelling and stasis. Local congestion between two tubes is much more effective than when one proximal tube is used. There is no doubt that non-operative treatment should be tried in cases of apparent non-union, in the hope that they are cases of delayed union. Only when efficient

FIG. 3.

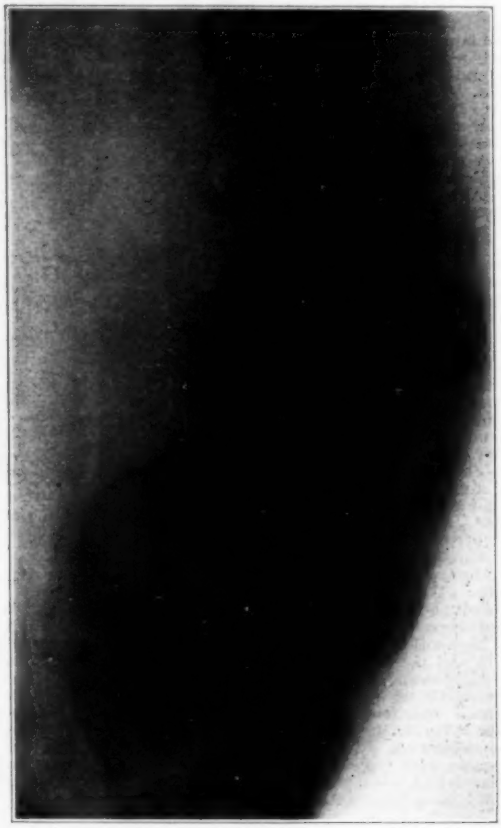
Position after two extensions on "gate" apparatus and traction from a pin through the tibia. The injured leg is now longer than normal.

conservative treatment fails should the case be condemned as one of non-union. Bone-grafting and reconstruction operations are then undertaken.

It is surprising what good results can be obtained in cases of mal-union of the femoral shaft with 3 in. or 4 in. shortening. Even after three or four months it is not difficult to re-break the fracture manually. In most of the cases I have seen the knee was stiffened by the previous treatment, and the mal-union could be broken down by forcible bending of the knee over the edge of the table. The worse the position of the bones, the less firm will be the exuberant callus. In old-standing cases of mal-union it may not be possible to re-fracture a bone, and the simplest method to employ is an oblique osteotomy through the callus between the original fragments of the shaft.

When the mal-united fracture has been re-broken and thoroughly freed manually, forcible extension by some means or another will reduce the shortening at one sitting by from 2 in. to 3 in. It has been my practice, after re-fracturing the bone, to forcibly stretch the limb for a few minutes on the gate apparatus (Fig. 1A), and while still stretched to apply a Thomas splint with fixed tape extension. While

FIG. 4.



Late or secondary displacement. After six weeks the splints were removed in order to fit a calliper with the result shown. The patient never left bed.

the limb is stretching on "the gates," and before the tapes are tied to the end of the Thomas splint, a nail or pin is passed through the tibia, as recommended by Hey Groves, just behind and below the tubercle. When the patient is back in bed a pulley is connected by a strong wire loop to the nail. When the patient returns to the ward a cord is tied to the end of the Balkan frame, is brought round this pulley, and passed over a pulley at the end of the bed; 20 lb. weight is at first employed, but with this arrangement of pulleys, apart from friction, the resultant weight is equivalent to 40 lb. This pin or calliper traction takes the place of the fixed extension. If, in a week's time, the shortening has not been completely corrected, the patient is brought to the theatre, anæsthetised, and the limb again stretched on the gate apparatus. It is seldom necessary to repeat the process more than once, and quite often the treatment will result—if not carefully watched—in the leg becoming too long (Figs. 2 and 3).

I have had in my Private Hospital during the last year a man, aged 70, whom Mr. Hey Groves kindly saw with me. He fractured the lower third of his femur when in a state of alcoholic exuberance, and did not think seriously of treatment for three months after the accident. The lower fragment was in the usual position behind; the upper fragment impaled the soft tissues at the outer side of the patella like a bayonet, and there was over 3½ in. shortening. Three months had elapsed, but there was no difficulty in breaking down the fracture by manipulating the knee over the edge of the table. The first stretching on the gates reduced the shortening by 2 in. For a week he was treated in fixed extension in a Thomas splint. Shortening to the extent of 1½ in. persisted, and further forcible

FIG. 5.

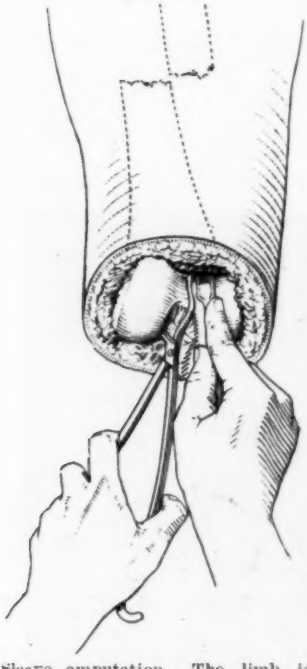
Same case as Fig. 4 showing femur ½ inch too long after "gate" extension (see Fig. 1A) and pin traction.

extension on the gates was employed. The shortening was this time completely reduced. With the assistance of Mr. Hey Groves, a pin was passed through the strong portion of the tibia in the region of the tubercle, and 40 lb. extension applied when the patient returned to bed. The weights were gradually reduced after the first fortnight to about 15 lb. Two months later the injured limb was found longer than the other.

Late or Secondary Displacement.

With calliper or pin extension, over-lengthening of the bones may be produced more readily than when other methods are employed. Care must be taken lest deformity recur after two or three months, owing to the plastic condition of the intervening callus, even though the patient is still kept in bed. There should be no interval between the removal of the extension and the application of a calliper splint. The latter should be worn both night and day for a considerable period. In the case just mentioned, the full length obtained and the good alignment were partially lost by allowing the patient to lie for a couple of days after two months without the extension. The final result was functionally good, with about ¾ in. shortening.

FIG. 6.



Sleeve amputation. The limb is removed by circular amputation and the bone shelled out in the manner shown.

I had experience of another case, in which a transverse osteotomy was performed in the lower third in order to correct outward rotation of the foot following gunshot injury to the hip (Figs. 4 and 5). A Thomas knee-splint was used for fixation, but was removed at the end of five or six weeks in order to fit a calliper. Before the latter was completed lateral displacement and overlapping of the fragments occurred, although the patient never left bed. This was subsequently corrected by re-breaking, stretching on the gates, and pin traction. After consolidation it was found that the leg had been lengthened by ½ in. beyond normal.

This question of late or secondary displacement requires some attention. It was new to me until recently, and I used to think of it as occurring only when patients were allowed to walk too soon without support. In both the cases to which I have alluded, the broken ends were held in good alignment, but in the first there was not close apposition, and a large gap remained to be filled up with reparative material. Such repair tissues undergo ossification in the adult very slowly, and probably at the end of six or eight weeks they are quite plastic. In a day or two the muscular tension may slowly deform the seat of fracture, so that the final result is very far short of that which was promised by X rays in the course of treatment. Hey Groves comments on this, and states that late displacement is specially liable to occur in the femur of adults.

One would hardly think it possible that an interval of a few days without apparatus, while the patient is still in bed, after six or eight weeks of extension, would lead to shortening and displacement, but that such may occur—especially where the treatment was for mal-union or where too much lengthening has been produced—is beyond doubt.

Amputation after Fracture of Femur.

Although I am dealing here with conservative treatment, I must mention that I have had four cases of fractured femur, in private practice, which ended in amputation. In three out of the four the limb was removed by a procedure I have called the "sleeve" amputation (Fig. 6). It is a modification of the discarded guillotine operation, and appears to me to be applicable to a group of cases in which orthodox methods would result in needless mutilation.

The method is designed to meet certain emergency operations with the least possible surgical risk, and with a view to the conservation of the longest possible stump. The orthodox method of obtaining healthy flaps well above the injury or disease is departed from, and the amputation is carried very much lower than most text-books would sanction.

I will quote one case by way of illustration:—

In 1916 a man was run over by a motor lorry and sustained a fracture about the middle of the shaft of the right femur. Ten days afterwards he was seen by me. The leg, from the foot to just below the knee, was gangrenous; the thigh was enormously swollen, red, and œdematous; the skin was mottled and vesicated, and large patches of black and purple discoloration extended over a wide area. The thigh had all the appearance of the early stages of moist gangrene which had already destroyed the leg. The œdema, vesication, and discoloration extended upward on the abdomen. A tourniquet could not be employed owing to the condition of the soft tissues, and for the same reason digital compression of the vessels was impossible.

An incision was made exposing the upper portion of the femoral artery for a length of 2 or 3 inches in order to ascertain its condition. The artery was pulsating at this level, and was held by an assistant between finger and thumb. A circular amputation was quickly performed *through* the knee-joint, just above the line of definite gangrene. The incision was carried above the margin of the patella in front, and the quadriceps extensor tendon divided. The attachments of the soft tissues to the femur were separated with knife and periosteal elevator until the lower segment could be withdrawn, like a cork from a bottle, by the rotatory movements of a heavy bone forceps. When the assistant released the femoral artery *there was no bleeding whatever at the end of the stump. At this level the vessels were thrombosed and obliterated.* The lower half of the thigh had now the appearance of the sleeve of a coat from which the hand and forearm had been removed. The sleeve was left open and lightly packed with iodoform gauze.

FIG. 7.

Stump some years after a sleeve amputation for compound fracture of the femur in the upper third.

The man made an uninterrupted recovery, except that there was an extensive sloughing of the skin in the upper portion of the thigh. He was seen in August, 1923, seven years after operation, and was walking without pain or discomfort with his artificial leg. A scar about the size of the palm of a hand in front and above indicated where the skin sloughed and had been skin-grafted. The scar through which the femoral artery was exposed was well seen on the inner side. An X ray photograph showed irregularities about the end of the femur, and the formation of well-marked osteophytes. Owing to the adequate

covering of soft tissues, these gave rise to no pain or discomfort whatever.

Fig. 7 shows the stump some years after a sleeve amputation for comminuted compound fracture of the upper third of the femur, the result of a bullet wound. Before amputation the soft tissues were riddled with discharging sinuses.

CATARACT EXTRACTION IN EGYPT.*

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IN a country such as Egypt, where trachoma is endemic and affects about 90 per cent. of the population, the preparation of cases as a preliminary to the extraction of cataract is an important matter. It is not the presence of the trachoma itself which is the danger, but the coexistence of such organisms as the pneumococcus, streptococcus, staphylococcus, Morax-Axenfeld bacillus, Koch-Weeks bacillus, and gonococcus, which has to be negatived before operation can be considered as safe.

The appropriate treatment for the particular stage of trachoma found in each case is adopted, and treatment is continued until the conjunctival secretion becomes innocuous.

Preparation of the Patient for Operation.

It is sometimes exceedingly difficult to get rid of dangerous organisms from an eye preparatory to operation. Where this is not possible after treatment as an in-patient for a fortnight, and where the conjunctiva is fairly smooth, we proceed with the operation, after having swabbed the conjunctiva with silver nitrate solution, 2 per cent., an hour previous to the operation. I have never seen any untoward occurrence after this procedure.

In order to overcome the nervousness which many patients feel when suddenly introduced into the completely strange atmosphere of the operation room, it is an invariable practice to put the patient on the operating table the day before the operation and teach him to look at his own hand, being the opposite one to the eye to be operated on, held up in front of him. At the operation a nurse holds up the patient's hand upon which the patient himself fixes his gaze. In this way we avoid telling the patient to look down to his feet, together with the consequent dangers of this procedure. The skin of the area surrounding the operation is painted with tincture of iodine; the orbicularis is then infiltrated with novocaine solution, 1 per cent., above and below the palpebral fissure; this greatly helps in keeping the patient quiet, and I have had far fewer unruly patients since I carried this out.

When the patient is placed on the table the conjunctiva is bleached with adrenalin chloride solution, and then the conjunctival sac is thoroughly flushed with lotion from an irrigator above the level of the patient's head. The fluid used in Egypt is invariably freshly prepared surgical eusol solution, made from bleaching powder which has been kept in an air-tight receptacle; unless this smells strongly of chlorine it is inert, and only useful by its mechanical effect. It is not dangerously irritating to the bleached and anæsthetic conjunctiva.

As I have been talking mainly of hospital patients I have omitted to mention the massage of the lids to get rid of excess of Meibomian secretion, which I practise for private cases a day or two before the operation. I have found it advisable but not always easy to get this carried out in hospital practice.

The Operation as Usually Performed in Egypt.

In describing to you the variety of cataract operation which is usually performed in Egypt, or was being performed while I was still Director of Ophthalmic Hospitals, I must remind you that I was invited to occupy that post in order to teach ophthalmology, including especially the operative side, to Egyptian surgeons, and not in order to perform an immense number of operations myself. It has therefore been my object to fix in the minds of my pupils, by usually practising it, what I considered to be the safest operation for the average operator. I have naturally had opportunities of performing most of the different operations, but the operation which I now do is, I consider, the safest both for myself and my pupils. I think that each operator should do that operation which suits him best, and which he can do in the least time, with the least possible damage to the tissues. Certainly since my return I have seen some beautiful operations performed by other surgeons by very different methods. In any case the surgeon must be ready to alter his procedure to suit the exigencies of the case.

I open the lens capsule with a Dalrymple's cataract needle which has a perfectly cylindrical shaft, without escape of aqueous. I make a fairly large section, including a small conjunctival flap. I then remove the speculum and deliver the lens, depressing the posterior border of the wound with a curette, and just touching the lower part of the cornea with the concavity of a strabismus hook. During this manœuvre the lids may be separated by the assistant with a strabismus hook under the upper lid, and his thumb on the lower lid. I frequently wash out the anterior chamber with normal salt solution which has been filtered and boiled immediately previous to the operation to remove soft cortex. Some years ago I had bad results after washing out the anterior chamber, but none since I have attended to the preparation of the solution myself. I use a syringe with a flat silver nozzle in preference to any apparatus which requires an assistant. A button-hole iridectomy in the periphery of the iris is then performed, the iris forceps used being straight and without teeth.

I believe that the presence of the intact iris is a great safeguard against rupture of the hyaloid membrane and consequent loss of vitreous during delivery of the lens. I prefer to make a button-hole iridectomy rather than to leave the case as a simple extraction, as I think that there is less liability to prolapse of the iris when there is an aperture in it through which aqueous can escape, in case the anterior chamber reopens. The intention to leave intact the pupillary border of the iris is also guided by the desire to prevent the possibility of the prolapse of capsule into the wound rather than by the desire to obtain a better cosmetic effect. I have no hesitation in doing a complete iridectomy if the iris does not seem to go back easily into the anterior chamber on irrigation; at all times I prefer to do this if there is a reasonable probability of prolapse occurring subsequent to the operation. A drop of atropine solution is instilled and both eyes are bandaged. A metal shield of some kind is placed over the dressing. At every dressing the strictest aseptic precautions are observed, as regards the surgeon's hands, the sterilisation of the dressings, and of the atropine drops. Carelessness in this respect is invariably punished sooner or later by signs of inflammation. I find that old patients with bronchitis or restless people usually remain much quieter if they are taken from the operating room and placed in a deck chair with a pillow under the head, than if they are put to bed and told not to stir under penalty of losing the good effect of the operation. I remove the pad from the eye unoperated on at the first dressing. I flush the conjunctival sac with antiseptic drops and after drying them up instil a drop of atropine solution daily. Dark glasses are given between the sixth and tenth days.

By whichever method the capsule is opened, whether by the point of the knife, capsule forceps, the needle, or the cystitome, a number of cases will require discission of capsule subsequently. If the membrane is really anterior lens capsule it may be needled at any time after vascular congestion has

* Read at the Ophthalmological Section of the Royal Society of Medicine.

disappeared. I have made a practice of needling such capsules ten days after the operation of extraction, provided that there is no redness. It must be very distinctly stated that the needling operation which I do is a very delicate affair, and consists in a single cut or tear of the membrane with a Dalrymple's needle. If an aperture is produced all is well, but if an aperture is not produced, either through clumsiness or through the membrane being thicker than was expected, no more is done, and it is dealt with on a subsequent occasion, as soon as all redness has disappeared. I occasionally use a Zeigler's knife, or a fine Graefe's knife, or more rarely two needles.

Sometimes one sees cases in which, owing to inflammatory conditions after the extraction, or owing to proliferation of the cells of the anterior capsule, the capsular membrane is thick and difficult to divide without causing dangerous traction on the ciliary body. I have no doubt that such cases are best dealt with by capsulotomy with de Wecker's scissors, an opening into the anterior chamber having been made with a keratome. I expect to do such operations without loss of vitreous. This operation should never be performed until a period of three months has elapsed since the last sign of inflammation in the eye disappeared.

In Egypt, where there is so much acute conjunctivitis with resultant corneal ulceration and disintegration of the globe, shrunken globes are very common, and one is frequently asked to extract a cataract in an eye which is fairly healthy otherwise, but in which the fellow eye is in a condition of phthisis bulbi. Now, as a matter of clinical experience, it is found that intra-ocular operations in a fairly good eye are frequently followed by iritis if the other eye is shrunken; also that sympathetic ophthalmia is a not unusual occurrence in a patient who has had a perforating ulcer of the cornea with prolapse of iris. I therefore invariably refuse to operate on the cataractous eye until its fellow, being in a condition of phthisis bulbi, has been removed.

I have not mentioned the importance of the routine examination carried out by the ophthalmic surgeon in charge of the hospital, all details being scheduled, including a note on the hæmoglobin percentage and the condition of the teeth. If the hæmoglobin is low, examinations are made for the ova of bilharzia, or ankylostoma, and if positive, the conditions are treated. Carious stumps are extracted by the surgeon, and if the frequent pyorrhœa alveolaris is present the gums are thoroughly swabbed daily for a period with tincture of iodine. Each cataract patient is given a toothbrush and is taught to use it with a solution of permanganate of potash. Before operation I always verify in the dark room the clinical notes made by the surgeon in charge of the hospital. My impression is that complicated cataracts are more common in Egypt, and it is easy for a surgeon of only two or three years' ophthalmic experience to miss an important sign, such as a faint tremor of the iris, which may be of the greatest importance to the operator or to the prognosis.

All cases of cataract extraction are examined and ordered appropriate glasses, if necessary at the Government expense. The fellahin, however, are usually satisfied with their unaided vision. If a patient does not come for examination he is sent for. In this way an exact record of the operative result is obtained. In order that each operator shall have a knowledge of his results it is insisted upon that he keeps a statistical record; this is also important for the purpose of clinical supervision.

Visual Acuity after Operation.

The visual acuity after cataract extraction in Egypt is usually poor as compared with that obtained in England. This is due to several reasons: First, the cornea is rarely clear, but has a leucoma, or nebula, or pannus; second, the intelligence of the patients in the country districts is frequently very undeveloped; and third, many even of the well-educated classes think it is bad luck to acknowledge how good their visual acuity after operation really is, though they may readily say that they are very pleased with the result. Also many cases of cataract in which the cornea seems to be clear when examined in the dark room before operation exhibit opalescence at the first dressing, due, as I suppose, to a refilling of old pannus vessels.

Difficulties Encountered in Egypt.

The operation of cataract extraction seems to be more difficult in Egypt than in England. The acquisition of sufficient Arabic for operative purposes is not a difficult matter, though a very necessary one, the difficulty being in the inability of the patient to sustain for the duration of the operation the required pose and immobility. On looking through my private notes I find several cases in which this is exemplified.

Case No. 13808, operated on at Asswan on March 25th, 1911, was a Berberine woman who understood no Arabic; she moaned and squeezed, and kept her eyes turned up during the whole operation. She was discharged from the hospital a month later with a clear gap in the capsule; impossible to take her vision, but she is able to get about well without glasses.

Case No. 6682, operated on at Zagazig on Feb. 14th, 1915; the patient squeezed as soon as the section was completed, the lens shot out in its capsule followed by vitreous. Iridectomy was done and the wound was sutured.

Case No. 14809, operated on at Damanhur on June 29th, 1911. After normal delivery of the lens the wound began to gape; the patient then squeezed, allowing a large escape of vitreous; the wound was closed with the ciliary body in view. Six weeks later the vision with sph. +9 and cyl. +1 was 6/36; the usual pre-existing nebula was present, and there was a fine capsular membrane.

The operation which I was in the habit of performing at this time was extraction with iridectomy, the capsule being opened with capsule forceps.

Case No. 8350, operated on at Medina-el-Fayum on March 16th, 1918. I failed to open the extraordinarily thick capsule of a Morgagnian cataract either with the point of the Graefe knife as it went across the A.C. in making the section, or with the cystitome. I therefore inserted the toothed iris forceps into the A.C. with the intention of tearing the capsule; however, the capsule was too tough to be lacerated, and I slowly withdrew a bladder-like Morgagnian cataract without loss of vitreous. The vision a fortnight after the operation was 6/24 with correction, the usual pannus being present.

I have notes of nine cases between 1916 and 1923 in which the lens was extracted with Macnamara's cataract spoon without losing vitreous. This was done in each case because some particular danger threatened, and not as an operation of election. A typical case was the following:—

No. 5304 was operated on at Rod-el-Farag, Cairo, on July 22nd, 1923. Extraction of cataract in a glaucomatous eye; the wound had to be enlarged, as owing to the shallow A.C. it was impossible to make the section adequately large; the capsule was opened with the cystitome. On commencing delivery of the lens the vitreous bulged; the lens was therefore scooped with Macnamara's spoon without loss of vitreous. A fortnight later the eye was quite quiet, the pupillary area being occupied with thick capsule for needling.

Another case of interest to me was No. 9904, Assiut, on which I operated on Sept. 28th, 1912. I found at the first dressing on the following day that the conjunctivo-corneal flap (at this time I was in the habit of making only a very small conjunctival flap) was anteflexed forwards on to the cornea. I therefore sutured it into position. Thick capsule was needled on Oct. 8th, or ten days after the extraction, after which the patient's vision with sph. +10 was 6/9.

It is certainly well to be prepared to suture the conjunctival flap in position if it shows signs of mal-apposition at the close of the operation. Recently I operated on a retired prize-fighter who exhibited signs of severe former injuries in a deflected nose and a pair of cauliflower ears. The cataract was about complete, while the other eye showed a posterior polar opacity, without, however, vitreous opacities. After section I opened the capsule with a cystitome and commenced delivery of the lens when vitreous protruded. I then did a complete iridectomy, and scooped the lens with slight vitreous loss. The wound gaped considerably so I put in two conjunctival sutures. At the first dressing in three days' time the eye was found to be perfectly quiet, but at the site of

the wound the conjunctiva was bulging. I took a depressed view of the case, but he was discharged from the hospital within a fortnight with a perfectly flat wound, a normal fundus as far as can be seen, and no vitreous opacities. To me this case was interesting, as if I had not had the necessary sutures and skilled assistance I believe that the eye would have been lost.

These cases with exceptional operative conditions are not often met with, but it is as well to be prepared for the worst.

Operation in a Glaucomatous Eye.

I have already referred to a case of extraction of a cataract from a glaucomatous eye. By this I mean either as a primary operation or as a secondary operation after a previous decompression operation. In Egypt it not infrequently happens that a lens which exhibits slight opacity rapidly becomes totally opaque after a decompression operation, which, as far as can be seen, has been perfectly performed, certainly in which no injury to the capsule of the lens can be detected. I suppose that some change in the nutrition of the lens must take place as the result of the reduction of tension, causing it to become opaque. I referred to this in my report for the year 1919 of the Ophthalmic Section of the Department of Public Health. I there gave details of ten such cases, all those on which I operated for this condition between December, 1909, and February, 1918. In no case was vitreous lost, and in seven of them useful vision resulted. During the same period 59 similar cases were operated on by my assistants with loss of vitreous in 8 cases, and resulting useful vision in 41 cases. It therefore seems that it is worth while attempting operation in such cases provided that even a small field only remains.

Forms Peculiar to Egypt.

There is a form of cataract found in children in Egypt which is rarely met with in England or in Europe. It is not congenital, for there is invariably a history of previous good vision, followed by a rather rapid diminution, over a period of two to six months. The condition is usually binocular, but monocular cases are sometimes seen, in which the healthy eye shows no sign of opacity. The condition has long been known to be associated with anæmia, but was first fully described by Granville Waddy in the *Bulletin* of the Ophthalmological Society of Egypt for 1914. The principal causes of anæmia are ankylostomiasis and bilharziasis, with which the disease pellagra is in severe cases sometimes associated.

Some of these cataracts contain little more than a milky fluid, so that after opening the lens capsule the opaque matter can be evacuated by paracentesis, leaving the lens capsule to be dealt with later by needling. Other lenses consist of gelatinous material which can be easily broken up with the cataract needle, and then evacuated at the same sitting through a keratome incision. More rarely the substance of the cataract resembles that of the normal lens, and should not be evacuated until the aqueous has had time to break down the lens fibres.

A moderate degree of anæmia seems to have no adverse influence on the prognosis of intra-ocular operations. Such operation wounds heal with extraordinarily little increased vascularity, and usually without the signs of iritis. The cause of the anæmia in ankylostomiasis has not been fully worked out. It is not due to hæmorrhage from the intestine, or to ingestion of blood by the worms. It has been shown by Boycott and Haldane that the volume of the blood in ankylostomiasis is increased to double the normal, while the oxygen-absorbing power is about normal. It is probable, though it is not proved, that the worm secretes a toxin, which, being absorbed by the human host, causes inhibitory changes in the blood-formation of the red marrow. The severity of the anæmia is not always proportional to the number of worms present. The treatment of the disease has recently been revolutionised by the discovery of the vermicide properties of carbon tetrachloride.

THE INDUCTION OF PREMATURE LABOUR.*

A RECORD OF SEVENTY-TWO CONSECUTIVE CASES.

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HILDA CANTRELL, M.B., CH.B. LIVERP.,
AND
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History.

THE first record of an induction of premature labour is that by Louise Bourgeois, midwife to Marie de Médicis in 1608. In 1756 a conference was held in London to discuss the frightful mortality of Cæsarean section, when Denman suggested induction of premature labour by rupture of the membranes as a therapeutic measure. Macaulay, of London, was the first to perform the operation on the wife of a linen draper in the Strand. In 1836 Kiwisch, of Wurzburg, introduced the method of induction by repeated douches of hot or cold water. In 1852 Barnes made use of an hourglass-shaped rubber bag with stopcock. In 1855 Krause introduced a method of induction by the insertion of a flexible bougie into the uterus. A few years later, in 1888, Champetier de Ribes's bag was invented, but could only be used after dilatation of the cervix. Small bags of very thin indiarubber were devised by Horrocks, of Guy's Hospital. Galabin approved this method, which he considered to be the most perfect, since it has the advantage, as compared with the use of the bougie, that there is very little risk of separating the placenta. The only difficulty is to get rubber bags made thin enough to dilate easily by hydrostatic pressure and yet strong enough not to burst.

Other methods, such as ecbolic drugs, separation of membranes from lower uterine segment, massage of breast or uterus, injection of glycerine between membranes and uterine wall, electricity, cervical tampons, have also all been used, but have nearly all been discarded with the exception of the quinine and castor-oil method, which is only successful in a small proportion of cases.

Propriety of the Operation.

The question of the propriety of the operation has been much discussed, more especially in cases of minor pelvic contraction. Williams thinks it has lost popularity in America owing to the high fœtal mortality. He himself has only done one case. In 391 operations by Ahlfeld, Bar, Leopold, and Pinard the fœtal mortality was 12 to 45 per cent., though the maternal mortality was only 1·03 per cent. They therefore held that it was no longer justified, and that equally good results for the mother, and far better for the child, would be obtained by subjecting the patient to the second stage of labour and resorting, if necessary, to Cæsarean section. Kleinwachter concluded, after an exhaustive study of the subject, that 78·3 per cent. of children were born alive, but only 60·4 per cent. left hospital alive. He considered that probably half of these born alive would die during the first year owing to unfavourable environment. He thought the operation should be abandoned, except when the child is abnormally large from excessive development or undue prolongation of pregnancy. Sarwey, in 2200 cases, found a maternal mortality of 1·4 per cent., and 0·6 per cent. of this was due to infection, not necessarily due to manipulations. The infant mortality was 30 to 60 per cent. In the Queen Charlotte Hospital records in 10,000 labours there were 206 inductions. There was no maternal mor-

* A paper read at a meeting of the North of England Obstetrical and Gynæcological Society.

tality, but 26 infants did not survive—viz., 12·6 per cent. Von Herff records 120 consecutive prophylactic inductions by rupture of the membranes, with a fœtal and infantile mortality of 20 per cent. In four years at the Liverpool Maternity Hospital (1916 to 1919), of 169 bougie inductions with no maternal mortality 171 children were born, with 25 fœtal and neonatal deaths—viz., 14 per cent. Prof. H. Briggs recorded in 1922 a series of 159 conservative bougie inductions in minor degrees of contracted pelvis, or fœtal over size, with eight stillbirths and five neonatal deaths—viz., approximately 8 per cent. Prof. Briggs regards induction favourably.

Most authorities, in discussing the induction of premature labour, state that the child requires greater care than a full-time child, and that the ultimate chance of life of the premature infant must be carefully considered. Prophylactic induction is most likely to be successful when pregnancy has advanced to the thirty-sixth week, and the conjugate of the brim measures at least 3½ inches. Some think labour should not be induced in a first pregnancy, but only with the history of previous difficulty or loss of child. The proper time must be determined by estimation of the relation between the size of the pelvis and that of the fœtal head, and the operation should be carried out as soon as there is difficulty in pushing the head in (to allow for the reduction for moulding). Eden advocates an examination under anæsthesia for the measurement of the diagonal conjugate, and the determination of the relative sizes of the head and pelvis.

Methods of Induction.

With any method it may be difficult to excite effective uterine contractions. There is no doubt that in some cases there is a personal idiosyncrasy, as in one of the cases included in this series, in whom, in two consecutive inductions, five days elapsed before labour pains started.

In our series of cases we chose the method considered by Galabin to be the most perfect—viz., the thin rubber bag—which we have employed in the form recommended by Prof. C. G. Lowry, of Belfast—viz., the toy balloon—distended by sterile water. With this method there is less risk of rupturing the membranes than with the bougie, the normally situated placenta is not interfered with, and there is less risk of carrying sepsis into the upper portion of the uterus. The insertion of the hydrostatic bag imitates closely the natural onset of labour and interferes little with its normal progress. The thin toy balloon is easy to insert, and there is no need for preliminary dilatation. If not more than 16 ounces of fluid are used there is no over-distension of the lower uterine segment. With the thin rubber bag there is very little displacement of the presenting part. The balloon can be boiled, so there is less risk of sepsis than with a gum elastic bougie, which cannot be so efficiently sterilised. It does not project from the vagina, so there is no ladder for the ascent of organisms.

The use of an anæsthetic is not a disadvantage. Though not essential it enables the examination to be more completely satisfactory, and a higher degree of asepsis to be attained, and it helps to remove the principal difficulties in induction of premature labour—viz., the recognition of the case requiring it, and the choice of the correct time.

Technique.

A general anæsthetic is employed. The vagina is douched with 1 in 2000 biniodide of mercury lotion and the uninflated balloon introduced with bullet forceps through the cervix, which is fixed by means of a modified Collin's lung forceps. Sixteen ounces of sterile water are introduced with a piston syringe through tubing tied on a glass tube in the neck of the balloon. The tubing is tied and a gauze pack left in the vagina to keep the tubing from projecting. The balloon and its connexions should always be previously tested.

Cases of Induction of Premature Labour.

The present investigation comprises 72 consecutive† cases, which were under observation during the years 1923 and 1924 at the Liverpool Maternity Hospital and Maternity Home.

Seventy-four infants were born, including two pairs of twins. Of the 72 inductions, 30 were primigravidæ and 42 were multigravidæ. In 65 of these cases delivery was effected per vias naturales, while seven were delivered by Cæsarean section.

In these 65 successful cases the average *period of gestation* was $38^{1}/_{5}$th week (primigrav., $38^{3}/_{5}$th weeks, multigrav., $38^{1}/_{12}$th weeks).

The average *weight* of the children was 6 lb. 12 oz. (primigrav., 6 lb. 8½ oz.; multigrav., 6 lb. 14 oz.), and the average length 19·2 in.

The average *time from induction* until pains began was 8 hr. 20 min. (primigrav., 7 hr. 12½ min.; multigrav., 9 hr.). As a comparison, in four years (1916–19), in 169 bougie inductions at the Liverpool Maternity Hospital, the average time from induction until pains began was 24 hours, almost three times as long. With the balloon inductions the average time from induction until delivery was 29 hr. 17 min. (primigrav., 36 hr. 9 min.; multigrav., 24 hr. 31 min.).

In the Liverpool Maternity Hospital reports 1916–19 as above, the duration was 46·6 hours, which is nearly double. The average length of time from induction until pains began and until delivery was much prolonged by two cases, one a primigravida who had no true labour pains for 110½ hours, and a multigravida who had no true labour pains for 183½ hours. Excluding these two cases the average length of time from induction until pains began was 2 hr. 47 min. in the primigravidæ (hospital cases) and 3 hr. in the multigravidæ.

General anæsthesia was employed in all cases but two multigravidæ with cardiac disease. The indications were: (1) a minor degree of pelvic contraction, 63 cases; (2) post-maturity and large fœtus, 6 cases; and (3) maternal disease, 5 cases (3 cardiac, 2 toxæmias).

Pelvic Measurements.—In 41 cases there was a minor degree of general contraction, the diagonal conjugate averaging 4·4 inches. Eighteen of these cases were primigravidæ with an average D.C. of 4·3 inches. Twenty-three were multigravidæ, averaging 4·4 inches. The smallest D.C. in a primigravida was 3·8 inches. In 22 cases there was a minor degree of flattening, the D.C. averaging 4·3 inches. Nine of these were primigravidæ, giving an average D.C. of 4·5 and 13 multigravidæ giving an average measurement of 4·2.

Results.—1. Natural delivery took place in 52 cases. 2. Delivery by forceps in nine cases. 3. Delivery by Cæsarean section in seven cases.

Forceps Cases.

CASE.

2. P. Flat pelvis. D.C. 4¼. R.O.P. Infant 6 lb. 12 oz.
12. P. Second twin. Uterine inertia. Infant 6 lb. 4 oz.
17. M. First induction failed. D.C. 4¼. High forceps. Infant 6 lb. 2 oz.
37. P. Prolonged second stage. Low forceps. Infant 6 lb. 1 oz.
46. P. 134 hours before labour began. D.C. 4¼. Mid. forceps. Fœtal stress. Infant 7 lb. 8 oz.
49. P. D.C. 4¼. Prolonged second stage. Low forceps. Infant 6 lb. 12 oz.
56. P. D.C. 3¾. Hyperemesis. Hæmorrhagic vomiting. *B. coli* infection. High forceps. Stiff pull. Child died of meningitis fourth day. No intracranial injury. Weight 6 lb. 1 oz.
64. M. D.C. 4¼. History of stillbirth and septicæmia. Toxæmia during pregnancy. Streptococci in urine. High forceps. Infant 9 lb. 8 oz.
68a. P. D.C. 4¼. Rigid cervix. Hydrocephalic infant with spina bifida. Stillbirth. Weight 4 lb. 13 oz.

Delivery by Cæsarean Section.

20. P. D.C. 4¼. Slight pains 4 days. No advance. Cæsarean. Weight 6 lb. 12 oz.
25. P. D.C. 4. Pelvic presentation. No advance in 3½ days. Cæsarean. Weight 6 lb. 7 oz.
31. M. D.C. 4¼. Two previous forceps. L.O.P. Uterine inertia. Cæsarean. 6 lb. 2 oz.
41. M. D.C. 4¼. Flat. Four forceps. One previous induction at 37 weeks. Induction. Transverse lie. Cæsarean section 23 hours after induction. Infant 7 lb. 2 oz.
44. M. Ten normal. 11th stillbirth. 12th lived one hour. 13th forceps. 14th balloon induction twice, followed by bougie induction. Uterine inertia. Cæsarean section by Dr. Willett. 6 lb. 13 oz.
54. 2-gravida. Previous delivery of 8 lb. infant after balloon induction. D.C. 4¼ in. Uterine inertia. Head remained above brim. Cæsarean. Infant 7 lb. 2 oz.
65. 2-gravida. First child normal delivery of infant 6 lb. 2 oz. D.C. 4 in. Contracted outlet. Full dilatation. Head above brim. Weight 8 lb. 5 oz.

† In this series a fatal case of eclampsia where induction was done at the thirtieth week is not included.

Pelvic Presentations.

There were eight pelvic presentations, of which three were born normally, and one by Cæsarean section. There was difficulty with four cases.

CASE.
33. P. D.C. 4¼. External version had failed. Delivered with difficulty of living child. Weight 7 lb. 3 oz.
51. P., with slight contraction and premature rupture of the membranes. Uterine inertia. Balloon induction. Four hours later balloon expelled followed by infant with extended legs. Weight 5 lb. 7 oz.
72. P. D.C. 4¼. Extended legs and arms brought down with difficulty. Weight 6 lb. 10 oz.
12. P. Twins. D.C. not reached. Difficulty with after-coming head. Stillbirth. Second twin forceps delivery. Weight 5 lb. 10 oz.

Malpresentations.—In one case already mentioned (Cæsarean section) a transverse lie occurred (Case 41). In another (Case 16) M., with previous difficult forceps delivery—after expulsion of balloon head remained high, hand and cord presenting, bag of membranes at vulva. Presentation was rectified under anæsthesia. Normal delivery 40 minutes later.

Results.

Mortality.—All the mothers survived. Of the 74 infants 72 were born alive—viz., all except the first twin in two cases, one being a hydrocephalic monster, and the other a pelvic presentation in a primigravida where there was difficulty with the after-coming head.

Neonatal Deaths.—1. One of meningitis (fourth day). 2. One of diarrhœa and vomiting (twelfth day). Breech. Weight 7 lb. 5 oz.

All the infants therefore but four—viz., 5·4 per cent.—left the hospital alive. Of the 70 living infants, 58 have been traced, and 55 are alive. Three are known to have died in the first year: (1) Enlarged thymus, five months. (2) Convulsions and wasting, six weeks (breech). (3) Marasmus at three months. (This infant was the second twin to stillborn hydrocephalic infant) (also a breech). Of the 74 infants the ultimate known mortality is 9 per cent.

Morbidity.—Morbidity occurred in one mother (No. 64). This patient was a 2-gravida. D.C. 4¼. The first child was a difficult forceps delivery with ruptured perineum which had not united, followed by septicæmia. Toxæmia with albuminuria was present during pregnancy. Induction was deferred on account of the history until 40²/₇th weeks, when the size of the child made it imperative. The large child, 9 lb. 8 oz., was delivered alive by high forceps operation (Tarnier's axis traction). Antistreptococcal serum was administered, and a bacteriological examination of the urine taken before delivery revealed streptococci. The temperature remained high for a few days, but the patient ultimately made a good recovery.

Special Points.—With a balloon induction, as with any other method, it is especially necessary to eliminate the possibility of latent sepsis, of gonococcal or streptococcal origin. It is important for the nurse in charge to note whether the head is following the balloon, and if not to push it into the pelvis.

Conclusions.

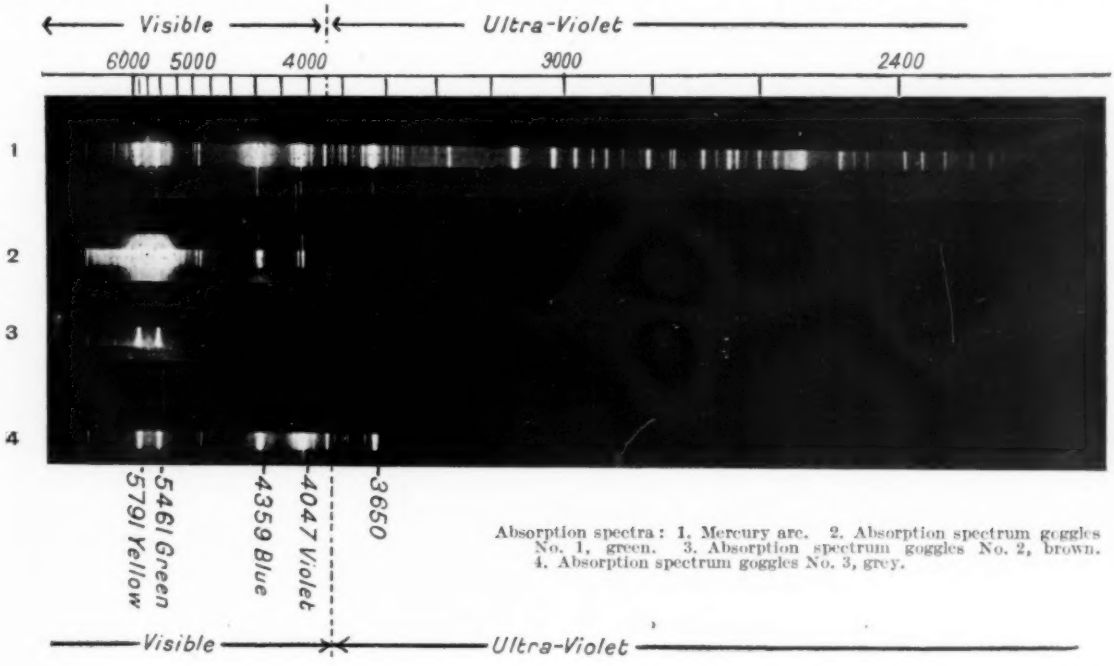
That by the induction of premature labour in suitable cases a considerable amount of unnecessary suffering from prolonged labour due to minor pelvic contraction may be avoided. In addition, induction of premature labour is not so inimical to the child as published statistics maintain.

THE SPECTROSCOPIC EXAMINATION OF ULTRA-VIOLET GOGGLES.

BY B. D. H. WATTERS, M.Sc.,
PHYSICS DEPARTMENT, MIDDLESEX HOSPITAL.

THE question of the quality of the goggles worn by operators when working in ultra-violet light is one which has scarcely received proper attention. These goggles have often to be worn for long periods, and they should transmit the maximum amount of the visible radiation, so as to allow the user to see the room and all apparatus, &c., perfectly clearly whilst every trace of ultra-violet is absorbed. Glass which fulfils both of these requirements is obtainable without difficulty, but a number of the goggles sold for this purpose are fitted with very inferior glass which often falls short on both counts.

A specimen was examined recently, as the operator who had been using them complained of headache and eyestrain after quite a short exposure. On taking a photograph of the absorption spectrum on a panchromatic plate, in a quartz spectrometer, the cause of the trouble was at once apparent. (See Fig. 4.) This glass transmits a considerable portion of the ultra-violet spectrum to about λ3500, thus allowing the intense mercury line at λ3650 to pass with very little diminished intensity. At the same time the lines of the visible spectrum are partially absorbed, giving rise to the dark-grey colour of the glass. Not only are the goggles unnecessarily dark in



Absorption spectra: 1. Mercury arc. 2. Absorption spectrum goggles No. 1, green. 3. Absorption spectrum goggles No. 2, brown. 4. Absorption spectrum goggles No. 3, grey.

tint, but, what is much worse, a dangerous quantity of ultra-violet light is transmitted.

That radiation of this wave-length is harmful can easily be proved by isolating it by a suitable filter, when it is found to cause a most painful sensation in the eyes if the exposure is longer than a few seconds. At the same time it will be noticed that the eyeball fluoresces brilliantly.

The grey goggles were replaced by a pair of light-green tint whose absorption spectrum is shown. (See Fig. 2.) The difference is strongly marked. The yellow and green light which is so strong visually is transmitted almost without absorption, the blue to a less extent, and the violet still less. No trace of any radiation is to be recorded even by prolonged exposure beyond the limit of the visible spectrum. These goggles have proved very satisfactory in use—everything in the room was clearly visible, and all painful sensation in the eyes completely disappeared.

For purposes of comparison the spectrum of a third pair is included (See Fig. 3.) These were brown in colour and transmitted only the yellow and green of the visible spectrum, whilst a faint trace of the ultra-violet line λ3650 will be noticed. The latter, however, is too weak in this case to have any perceptible effect. This pair of glasses may therefore be classed as not quite so good as the green ones, but probably quite efficient in use, and very much better than the original grey ones.

To summarise, it is clear that the mere visual examination of a pair of goggles is quite insufficient to indicate their suitability or otherwise for use in ultra-violet work—a spectroscopic examination is essential.

Clinical and Laboratory Notes.

A CASE OF SPONTANEOUS PNEUMOTHORAX.

RAPID AND COMPLETE RECOVERY.

BY F. H. KELLY, M.B., B.S. LOND.

CASES of spontaneous pneumothorax, apart from those occurring in the course of active tuberculous disease of the lung, are not always characterised by a prolonged course or by a bad ultimate prognosis, as the following case shows.

The patient was a thin and slightly-built man aged 32. There was no history of previous illness, and he had served through the war without trouble. On the morning of Feb. 26th last he experienced sudden pain in the region of the sternum whilst stooping down after breakfast. He worked all day although the pain continued, and he had considerable shortness of breath.

Condition on Examination.—When seen for the first time on the 27th he had obvious signs of complete left pneumothorax. The left side was increased in size as compared with the right, but moved less. The percussion note showed increased resonance on the left side but was not tympanitic. The lower limit of resonance at the back was 2 in. lower on the left side than on the right. There was complete absence of vocal fremitus and vocal resonance on the left side. There was no cardiac dullness in the usual place, its left edge appearing to coincide with the right edge of the sternum. The apex beat could not be felt, but the position of maximum intensity of the heart sounds was exactly in the mid-line of the sternum. There was obvious dyspnœa even when lying in bed, and this was markedly increased by even gentle movement. The pain was not severe so long as the patient kept quite still.

Up to April 4th, on which day the patient was seen, there was practically no change in the condition of the chest. The left side became gradually a little less resonant, but was still distinctly more so than the right. At the back the lower limit of resonance was now only 1–1½ in. lower on the left side than on the right. The position of the maximum intensity of the heart sounds was still approximately in the middle line, but was a little difficult to locate owing to the development of a loud slapping extra-cardiac sound, due presumably to the forcing together of two pleural surfaces by the heart's action. During this time the patient had gradually been promoted to getting up one hour a day, pain had disappeared, and dyspnœa was much less. The temperature, taken each evening at 6 o'clock, had never exceeded 98° F.

On April 6th, five weeks and four days after the onset, the cardiac dullness was found to be restored to its normal position, the apex beat was ½ in. internal to the nipple line, all the signs described above had disappeared, and in fact the chest appeared to be in all respects normal except that the breath sounds on the left side were not so good as on the right (this difference disappeared in a few days). The contrast from the condition only two days previously was amazing.

The subsequent progress of the case has been one of uninterrupted recovery. No abnormal signs have been found in the chest on either side and the patient appears now (June 15th) to be perfectly fit and well in every respect. He started work again a few weeks ago.

Hurstpierpoint, Sussex.

A CASE OF CHRONIC MENINGITIS LASTING FIFTEEN YEARS.

BY MARY HAMILTON WILLIAMS, M.B., B.S. LOND., D.P.H. CAMB.

THIS case is reported in order to suggest that there are more cases of intractable headache due to chronic germ infection of the meninges than is recognised.

Early History.—The patient, a married woman aged 55, had an early history of arrested pulmonary tuberculosis, malaria, and cerebro-spinal fever. A growth had been twice removed from the left antrum, and she had had a high degree of myopia. At the age of 40 the patient lost 3 st. in weight in less than a year, and this was ascribed to a probable recrudescence of tuberculosis. During this year she had attacks of partial loss of vision, occurring suddenly, and also saw flashes of white light, very brilliant, often appearing to resemble showers of falling stars. Sometimes the light was coloured and zig-zag. The flashes always appeared to the left eye. After one to two hours visual disturbance acute pain in the head set in. This was at first localised in the right occipital and parietal regions, and then diffused. There was also aphasia, nausea, acute photophobia, tenderness, and aching of the right cervical glands. During this year the patient lost two-thirds of her hair. The patient was examined by various consultants, who agreed that the trouble was probably tuberculous. Sir Victor Horsley diagnosed a meningitis 15 years ago, but considered it inoperable. The oculist diagnosed "typical migraine," and found bi-temporal limitation of fields of vision; fundus normal. These attacks at first occurred every six weeks, but gradually became more frequent.

Subsequent History.—As the years passed the patient lost strength, and any considerable fatigue brought on an attack. After an attack—not during—there was marked pallor of the face. Insomnia became very troublesome, whole nights being passed without sleep. There were also terrifying dreams. Either before or during an attack a period of extreme drowsiness would occur, lasting several hours, and not terminating in restful sleep. All possible means were tried to give sleep, as otherwise insanity would have been the termination. The patient continued to do brain-work, and did not consider that this tended to bring on an attack. But it was necessary to work in a warm room (70° F. for choice) and backing the light. Work which required lateral movements of the eyes—e.g., checking a catalogue—brought on pain. On waking in the morning, and sometimes during the night, there were jerky movements of arms, hands, legs, and feet. When the patient first drank in the morning there was sometimes acute pain at a special point which appeared to be about the cardiac orifice of the stomach, and the patient could not swallow until it passed.

After the attacks had continued during some five years it was noticed that before an attack there was frequently slight epistaxis, and during the attack there was constipation. After an attack ended pain was never again caused, for at least 48 hours, by exercise or exertion, which, at any other time, would have started pain with certainty. The temperature was always raised, being 99·4° in the morning and reaching 102° or higher on some nights. This was at the time ascribed to a recrudescence of tuberculosis. After about ten years had passed dyspnœa was first noticed,

and the pulse was slow, 70–76, even with pyrexia. The attacks gradually became more frequent, and the patient reached a condition when she was never free from pain for more than a few hours, and the insomnia and dyspnœa grew worse.

Two unusually severe attacks made it evident that, if operation was not possible, the patient's life would be short. In these attacks there were great drowsiness and agonising right occipital pain; flashing in the left eye, acute dyspnœa, the pulse-rate varying from 58–66, and intermitting seriously, with absolute insomnia. Plantar reflexes not detected; Kernig positive. There was some flashing in the right eye. A few days later there was definite extensor response to plantar reflex. An area of acute local tenderness was present over the right occipital area, and there was also slight œdema here, lasting some hours. On each of these two attacks, after the head pain had lasted some hours, severe stabbing pains set in in the shoulders and back. A peculiar sensation and thrill in the muscles was also present. In addition to the dyspnœa there was great air-hunger, so that the patient only breathed happily in front of a large open window.

The patient was taken to London and Mr. Donald Armour decided, despite the absence of definite localising symptoms, and at the express wish of the patient, that he would operate.

Definite extensor plantar reflexes were found which often varied from day to day. There was some œdema, as before, and it was considered that this and the localised pain would suffice for localisation. Sufficient bone was therefore removed from the right occipital and parietal regions to allow for access to the cranial contents. Considerable fluid was found outside the dura mater, with great bulging of the meninges, the dura being under high pressure. The meninges were three to four times as thick as normal, and this area was removed. The cerebro-spinal fluid escaped under high pressure. No sign of tuberculoma was found. The scalp was replaced, leaving a large area without bone.

On recovery from the anæsthetic the patient said she felt as if she could not breathe and it was necessary to keep an electric fan working close to her night and day. (In a recent report of a post-mortem on such a case I noted that there were numerous small hæmorrhages found in the region of the vital centres in the medulla, suggesting a cause for air-hunger.) The condition took several days to pass off.

Post-operative History.—After the operation photophobia was extreme and brilliant white sheets of light lasting for hours were distressing. Unfortunately it had been taken for granted that the germ causing the meningitis was the tubercle bacillus, and therefore no cultures were made. Since the operation the patient is much improved, the elasticity of the scalp preventing dangerous degrees of pressure occurring, but the insomnia and pain became again troublesome towards the end of last year, and a vaccine was made from the post-nasal region, after a most exhaustive negative X ray examination of all the head region. Dr. L. G. Mackey found an infection of pneumococcus and influenza and from this made a vaccine. Only small doses can be used, but the patient is again improving, leading a busy working life.

An uneducated patient would have been unable to give the descriptions which here helped this diagnosis. "Migraine" is a diagnosis of a highly unsatisfactory character, and the causal germs need ascertaining.

Colwall, Malvern.

DONATIONS AND BEQUESTS.—By the will of the late Miss Elizabeth Jane Humby, of Hamilton-terrace, St. John's Wood, the testatrix left, among other bequests, £100 each to the Royal National Sanatorium for Consumption, Bournemouth, the Western General Dispensary, Marylebone-road, the Royal Medical Benevolent Fund, the Royal Medical Benevolent Fund Guild, St. Mary's Hospital, Paddington, the Middlesex Hospital, and the Church Army; £50 each to the London Fever Hospital, the Hospital for Epilepsy and Paralysis, the Paddington Green Children's Hospital, and King Edward's Hospital Fund.

CONTRIBUTORY SCHEME AT IPSWICH.—A contributory scheme is about to be started by the East Suffolk and Ipswich Hospital. It is proposed to include not only industrial weekly wage-earners, but also the clerical staffs in the factories, the employees of shops and offices, and the one-man trader. An agricultural contributory scheme has been in existence for the last six years, each farm-worker giving a penny a week with a similar amount from his employer. During the last 15 years members of the board of management have subscribed £45,000 for the enlargement, improvement, and maintenance of the hospital.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING AT BATH.

SECTION OF OBSTETRICS AND GYNÆCOLOGY.

THIS Section met on three days—Wednesday, Thursday, and Friday—Lady Barrett (London) occupying the chair.

WEDNESDAY, JULY 22ND.

MALIGNANT DISEASE OF THE PELVIC ORGANS.

Prof. B. P. Watson (Edinburgh), in an opening address on the

Problem of Cancer of the Uterus,

said that the toll this disease took of the population of the world was enormous, and although we did not know the cause, yet chronic irritation was so constantly present in cancer of the cervix that it must be recognised as one of the ætiological factors. Cervical cancer was ten times more common than uterine cancer, and it was essentially a disease of parous women. He thought that the incidence of the disease could be diminished (1) by avoiding all procedures likely to cause cervical lacerations at childbirth; (2) by the thorough treatment, and, if necessary, removal of the existing lesions. Women should be made to understand that long-continued leucorrhœal discharge indicated a diseased condition, and called for investigation and treatment. He considered that operations such as a plastic repair or amputation of the cervix were very simple procedures and devoid of risk. In his opinion the more extensive employment of these prophylactic measures at or about the menopause would diminish the incidence of the disease and early diagnosis would lessen the mortality. Prof. Watson emphasised the importance of teaching students the necessity of thoroughly investigating every case of irregular vaginal bleeding in women of all ages, nor should they be satisfied until cancer was definitely excluded. He maintained that it was only by this means that the early cases would be recognised.

The speaker then proceeded to discuss the relative merits of operative and radium treatment in cancer of the uterus. He had formed the opinion that in a clearly operable case of cancer of the cervix operation preceded by radium treatment offered the best chance to the patient, but in border-line and advanced cases radium treatment was the only one that held out any hope. In cancer of the body, however, he thought that operation offered a better chance than radium treatment. He held that wherever the disease, and whatever the treatment employed, the chances of cure were in inverse proportion to the duration of the symptoms. Prof. Watson finally made a strong appeal for a widespread educational propaganda to be carried on amongst the people in order that the cases might be seen early. He did not think it would unduly alarm the women of this country, for ten years' work among women on the other side of the Atlantic had convinced him that more good than harm resulted from such knowledge.

Mr. Victor Bonney then read a paper on the

Operative Treatment of Carcinoma of the Uterus.

He said that he welcomed the opportunity of speaking on the operative treatment of carcimona of the uterus because he had no doubt at all that, up to the present time, it remained the treatment of election for the majority of cases. Dealing first with carcinoma of the cervix he reminded his hearers that here, as in every other variety of carcinoma, the growth extended itself in two ways—tissue infiltration and lymphatic permeation, and the line of operative excision must, therefore, be planned so that whilst at all points it kept outside the margin of growth by infiltration, it was extended in the regions of lymphatic permeation as far outwards as the anatomy of the parts and the endurance of the patient would permit. The operation which fulfilled these requirements was that introduced by the

Viennese gynæcologist, Wertheim. From 1907 to the present day he (Mr. Bonney) had performed Wertheim's operation about 300 times, but since no figures bearing on the subject were of any value unless grounded on the basis of five years' freedom from recurrence he dealt only with the first 192 cases of the series. These cases should be looked upon as the number he was able to operate radically upon, out of 303 unselected patients seen by him between the years 1907–20. With so high an operability rate it followed that in a large proportion of the patients the disease was well advanced, and in many cases very advanced. In general, the only bars to the accomplishment of the operation that he had recognised had been deep and extensive involvement of the bladder or the bowel, or involvement of both ureters to the extent of producing bi-lateral hydro-ureter. He had found what others practising the operation had found—namely, that in many cases it was impossible to determine whether the growth was removable or not, except by opening the abdomen. The operation as performed by him had always been as drastic and radical as he believed it possible to perform while giving the patient a good chance of recovery. The uterus and appendages, the whole or practically the whole vagina, together with the parametric and paravaginal tissue occupying the obturator fossæ and the glands along the external iliac vessels were removed. As regards the vagina, he had extended the operation of recent years; originally removing the upper half only he now removed it entire in most cases, because, next to the lymphatics which run out to the obturator fossæ, the vaginal wall was the most important line of march of the cancer cells. His results were as follows: Died of the operation, 32 (an operative mortality-rate of 16 per cent.); died of recurrent growth, 70; died of other disease, 5; lost sight of, 7; well after five years, 78 (that is 40 per cent. of the whole series, or nearly 49 per cent. of the cases recovering from the operation, or 25 per cent. of all the cases seen, reckoning his operability rate at 63 per cent.).

The operative mortality was high compared with that of ordinary operations of surgery, but he could have reduced it by performing a less drastic operation and by refusing to operate on the many "last chances" he had undertaken. The likelihood of recurrence was greatest in the first two years, and progressively diminished from then onwards. Five years' freedom from recurrence used to be considered an absolute cure, but unfortunately that was not quite true, as a certain small number of recurrences (about 3 per cent. of all recurrences) took place after five years, the latest among his cases being six and a half years. In regard to the 78 cases reported as "well" after five years, the accomplishment rate of the operation depended upon the point of view from which it was considered. Thus, reckoning for the present purpose all these cases as cures, then out of the 303 unselected cases of carcinoma of the cervix seen by him between 1907 and 1920 25 per cent. were cured. Lastly, taking only these cases that recovered from the operation, there were cured just on 49 per cent. of the 160 patients who recovered from the operations performed between 1907 and 1920. In 78 of the cases the glands removed at the operation were carcinomatous, and it had been argued that where this was found to be the case it was useless, or usually useless, to proceed with the operation. Although the outlook for cases with carcinomatous glands obviously could not be as good as for cases in which the glands were not carcinomatous, it was by no means hopeless; 25·6 per cent. of the 78 cases operated on were well after five years and 33·3 per cent. of the 60 cases recovered from the operation. He did not use radium beforehand as a routine, though he had operated on a good many cases in which it had been so used with the idea of making the growth removable. Those who said it could do this did not know the limits of operability. It did nothing of the sort, but on the contrary made the operation much more formidable on account of the intense fibrosis set up which so welded the surrounding tissues to the growth that all planes of cleavage were lost and the separation of the bladder and ureters became a matter of great difficulty. Except in exceptional instances irradiation after the operation was not advisable, for the indiscriminate use of radiation without guide either as to direction or depth carried with it the very real danger of stimulating instead of killing any stray malignant cells that might have been left behind at the operation.

Turning to the surgical treatment of carcinoma of the corpus, Mr. Bonney said that the problem of diagnosing the disease must be given an important place. It was frequently necessary to explore the interior of the uterus under an anæsthetic, and even then it was sometimes impossible to scrape out anything worth microscopical investigation. Bleeding after the menopause should always be regarded as a menacing sign, and the likelihood of error should always be on the side of an interpretation too grave rather than too optimistic. The operation he performed was a free total hysterectomy, taking out the uterus, the vaginal vault, and both appendages, dividing the ovario-pelvic ligaments at the point where they take off from the pelvic brim. He only did Wertheim's operation in special instances. In his experience at least 50 per cent. of the patients recovering from operation were free from recurrence five years afterwards. This estimate was not based on accurate statistics, as he had not followed up these cases with the same thoroughness as in the case of those with cervical carcinoma.

Mr. S. J. Cameron (Glasgow) said that he intended to confine his remarks to

Cancerous and Sarcomatous Disease of the Ovaries and Cancer of the Fallopian Tubes.

He purposely omitted chorion-epithelioma and only briefly referred to the Krukenberg tumours of the ovary, which, in his opinion, were almost invariably secondary to cancer of the stomach. He based his paper on 94 unpublished cases. In his experience primary cancer of the ovary was much more uncommon than the secondary type, which, owing to its obtrusive size, had attention called to it, whereas the primary growth, being small and giving rise to no urgent symptoms, often remained unrecognised. Apparently the ovary provided a suitable soil for the implanted cancer cells, and, although it was generally accepted that the histological appearance of the secondary growth was the same as the primary, he had not always found this so. The speaker made a strong plea for the careful microscopic examination of all ovarian cystoma after removal, as a naked-eye examination might fail to reveal malignancy. The latter condition should always be suspected in a woman who had been in failing health for some time previously, and more especially if ascites were present. Sarcoma of the ovary was much less common than carcinoma, but the prognosis in either case was almost equally bad. Mr. Cameron drew attention to the difficulty of making an early diagnosis in these cases and hoped that Gye's recent work would make this possible in the near future. In referring to primary cancer of the Fallopian tubes, the speaker said that this condition was rare; he personally had only met with two cases. The diagnosis was difficult and the most prominent symptom was a copious watery discharge which might occasionally be blood-stained.

Discussion.

Mr. H. J. D. Smythe (Bristol) was interested to hear that Mr. Bonney now removed the whole of the vagina in Wertheim's hysterectomy. He agreed with Prof. Watson on the importance of the prophylactic treatment of cervical lesions, and stated that he always performed a pan-hysterectomy in these cases.

Prof. W. C. Swayne[1] (Bristol) said that Mr. Bonney had proved by his figures that the most radical

[1] The tragic death of Prof. W. C. Swayne was the subject of an obituary notice in THE LANCET of August 22nd, 1925 (p. 410)

operation in carcinoma of the cervix was the best. He agreed about educating the public, but thought that the propaganda could only be carried out by the general practitioner.

Prof. F. W. Marlow (Toronto) drew attention to the value of slow cauterisation of the growth as a preliminary to operation. The technique he employed was a modification of the Percy method. It was safer than radium as it removed the focus of infection.

Mr. Sidney Forsdike (London) said that he had never found any great difficulty with prophylactic radiation in cancer of the cervix. He would be interested to hear the methods and technique employed by Mr. Bonney in these cases.

Dr. M. Donaldson (London) strongly protested against the sweeping statements made by some of the speakers who opposed the use of radium, although it was obvious that they had had very little, if any, experience of its use. He pointed out that one of the speakers condemned radium after seeing a few patients who had been treated by applications which lasted less than 12 hours.

Mr. Leith Murray (Liverpool) pleaded for the better training of midwives, as they were often consulted before practitioners in these cases.

Replies.

Several other speakers took part in the discussion, and Prof. Watson and Mr. Cameron briefly replied.

Mr. Victor Bonney deprecated the criticism of the results he had obtained in cases in which the regional glands were carcinomatous, where radium was incapable of effecting a cure. The advocates of radiation would, no doubt, say that the carcinomatous regional glands could be treated by deep X rays, but his experience of this treatment, both for primary and secondary growths, was most disappointing. He had seen many cases in which the growth was certainly delayed, but never once had he seen a cure. In short, the only cure for cases in which the regional glands were malignant was operative removal, and this being so he saw no point in girding against the results of a treatment which, though very far from ideal, was yet the only treatment which held out any hope. He submitted that to have "cured" 25 per cent. of these cases was an unexpectedly great triumph. If it were possible to recognise before the operation those cases in which the glands were carcinomatous he would not adversely criticise the surgeon who considered that, as a group, they were not worth operating on, seeing that the risk of the operation was great and the chances of permanent cure relatively small. He should not agree with such a view himself, but it would be a matter of personal opinion which every surgeon would have to decide for himself. It was, however, impossible to make such a distinction not only before the operation, but even during the operation, for until the glands were removed it was, in many cases, impossible to say whether they were malignant or not.

No one was more anxious than himself to find a better method of treating carcinoma of the cervix than operation, but there was no sense in the advocates of radiation carping at the results of surgery until they had produced a series of figures comparable with those he had just put before them. It was no use trading on foreign sources for such figures: a study of the literature showed how entirely discordant they were. What was needed was the publication of a British series of not less than 100 cases treated by radiation, in all of which at least five years had elapsed between the date of cessation of all treatment and the date of publication. The interval that had elapsed since the cessation of all treatment was of prime importance. There was a great difference between keeping a patient alive with a carcinoma and curing a carcinoma. When such a series, produced from a reliable British source, gave a better cure-rate than he had obtained by operation, then he would immediately cease to operate any longer and hand over all his cases of cancer of the cervix to the radiologists.

THURSDAY, JULY 23RD.

Prof. James Heyman (Stockholm) opened a discussion on the

Treatment of Inoperable Cancer of the Pelvic Organs.

He said that he intended to set forth the result of his experience at the gynæcological department of the Radium-Hemmett, Stockholm, during the 15 years of its existence. This institution was founded by the Swedish Cancer Research Society for the radiological treatment of cancer cases referred from other hospitals. Radium treatment had been almost wholly restricted to inoperable cases, with the exception of cancer of the cervix, where the figures submitted in the first published report (1920) had been so striking that the leading Swedish gynæcologists had since that date ceased operating for this condition. The speaker claimed that he could report on 100 per cent. of the cases treated. This had been made possible by organised control of the patients and by the fact that owing to a special Act of Parliament the Swedish Government paid the travelling expenses of the poorer patients to and from the Radium-Hemmett.

Cancer of the cervix formed the most important group, and during the years 1914–22 inclusive they had treated 440 inoperable cases of this disease with radium. Of this number 243 had been under observation for five years or longer, 39 of whom remained free from symptoms. This gave a figure of 16·7 per cent. of permanent cures amongst cases which would otherwise have been regarded as hopeless. In addition two-thirds of the cases had regained sufficient strength to resume work and nearly half of these had remained at work over a year. Inoperable cancer of the body formed a smaller group than the preceding one and included those technically operable cases which, on account of old age and pronounced adiposity, rendered them unsuitable for operation. Out of 54 such cases treated with radium between the years 1915 and 1922 inclusive, 17 had been observed for five years or longer; of these 10, or 58·7 per cent., had remained free from symptoms. Inoperable cancer of the vulva and vagina had not reacted well to radium treatment, and results obtained from the treatment of ovarian carcinoma were disappointing. Six cases of cancer of the urethra were treated—the results were not good.

Prof. Heyman then briefly referred to the technique he employed and the methods of treatment adopted. He always used radium salts which were filtered through 3–4 mm. of lead, and as a rule only three applications were made. If possible radium was inserted at each of these treatments both in the vagina and the uterus. He rarely combined the treatment with X rays, nor did he approve of previous curettage.

Mr. Percival Cole (London), who followed, confined his remarks to the

General Position and Treatment of Inoperable Cancer of the Uterus.

He said that the numerical importance of the subject before them was emphasised by the inoperability rate which he estimated at 62 per cent. Operability, or otherwise, of any particular case was generally decided by the extent of local invasion, and it was estimated that in 60 per cent. of cases of cancer of the cervix death occurred as the results of effects determined by what remained to the last a local lesion. The regional glands were involved in from 24 to 38 per cent. of cases. Mr. Cole gave an account of the result of his experience at the Cancer Hospital, London, where 263 cases of cancer of the uterus were admitted between and including the years 1919–25. Of the cases admitted 103 were treated with radium and 61 by the Percy cautery operation; only 12 per cent. of cases were operable and 40 per cent. were too far advanced for any form of treatment. In discussing the technique employed in radium treatment he emphasised the importance of using

dosage and filtration suitable to the case. He had found that the use of needles and gauze packing had largely obviated the most important of the radium sequelæ—namely, proctitis, cystitis, and fistula formation. He did not approve of unfiltered glass capsules of radium emanation. He drew attention to the possibility of a violent hæmorrhage after the use of radium. This had occurred in five of his cases. He now ligatured the internal iliacs in the worst type of case. The speaker commented favourably on the systematic radiation of the pelvis by X rays after local radium applications, but had nothing favourable to say about the use of colloidal preparations. In referring to the Percy cautery operation he said that the average life duration of those who died had been 13·9 months after operation, which compared with 8·9 months in the radium cases after treatment and a total duration of life of 14·8 months in untreated inoperable cases. He had found that post-operative progress with relief of symptoms and absence of shock was a striking phenomenon following the Percy operation. He sometimes employed small doses of radium six to eight weeks afterwards.

Dr. M. Donaldson, in his paper on

Treatment of Inoperable Cancer of the Pelvic Organs,

pointed out the necessity for educating the public on the early symptoms that might point to malignant disease in women. He did not believe this would increase the number of cases of "cancer phobias," but would tend to diminish it. He then described in detail the technique he employed for radium treatment of carcinoma of the cervix, the main principles of which were the use of 20 or more long needles of moderate intensity buried in and around the growth giving a continuous exposure for six days. The results of this technique were more promising than those of the method he had previously employed. He then drew attention to the necessity of investigating the biological laws involved in irradiating living tissues, and stated that interesting work by Dr. T. S. P. Strangeways and his other colleagues was being done on the effect of irradiation of tissue cultures, the results of which emphasised the importance of the distance and time factors. Finally, he pointed out the urgent necessity for organised and coördinated research, and hoped that the profession as a whole would urge the raising of public funds for this purpose.

Discussion.

Mr. Sidney Forsdike drew attention to the type of case where radium was contraindicated. He described the technique he employed and stated that he always removed any necrotic growth with a blunt curette as a preliminary to radium treatment.

Mr. G. I. Strachan (Cardiff) called attention to the risk of applying radium in cases of pyometra.

Circulatory Changes in Normal Pregnancies.

Dr. Dorothy C. Hare (London) read a paper comprising a preliminary report on an investigation of cardio-vascular conditions in normal pregnancy by means of clinical tests. The object of the investigation was to discover if by the methods of clinical examination evidence could be obtained of changes in the pulse-rates, blood-pressures, and response to exercise tests during the course of pregnancy and to relate such changes to the period of pregnancy in which they occurred. A series of observations on 40 pregnant women was made at four-weekly intervals, and the tests applied under uniform conditions; a number of other pregnant cases were examined once and their records included; 50 women medical students also were examined as controls. Other control figures were also obtained from the work of L. D. Cripps. As the report was a preliminary one the results were therefore incomplete. The mean of the figures obtained in each month of pregnancy was charted and the curves compared with the range of figures in the groups of control cases. The results, so far as they went, were remarkable for the high degree of "normality" and "efficiency" shown. The mean pulse-rates lay within or below the control figures.

	Pregnants.	Controls.
Lying pulse-rate ..	83 to 85	None.
Sitting „ ..	75 „ 87	77·5 to 88.
Standing „ ..	88 „ 99	90 „ 87.

It was only in the fourth month of pregnancy that the rate lay outside the range of the control figures, and there was no marked difference in the last months from the earlier months. A study of individual pulse records showed no general tendency to increase of rate in the later months. The difference between the lying or sitting pulse-rates and the standing rate was generally recognised as a test of the efficiency of the cardio-vascular mechanism in making rapid adjustments to change of position. An increase of 15 beats or less was usually considered a "normal" response. It was found that 88 per cent. of pregnant women gave a "normal" response and that only two abnormal responses occurred in the last two months. Comparison of the sitting and lying pulse-rates of the individual showed little difference on the whole, an increase or slowing of the rate with the change of position being met with in almost equal numbers. An exception to this was found in the eighth month of pregnancy, when the majority of patients have a slower sitting than lying rate. This was probably to be attributed to the position of the uterus in that month causing an embarrassment of the diaphragm and circulation when lying, which was relieved when the patient sat up, with a consequent slowing of the pulse-rate. The response to change of position in the ninth month was reversed. The exercise efficiency test used was an easy one. Patients stepped up and down on to a stool 7 in. high 30 times in 60 seconds. The pulse-rates after the exercise were recorded. A "normal response" might be taken as a return to or below the resting-rate in that time. A larger percentage of "normal responses" was found in the records of the later than in the earlier months. The blood pressures of the patients were recorded in the lying and sitting positions. They were taken by auscultation over the brachial artery, two observers working simultaneously on the two arms, two arm-bands being attached to the same mercury manometer. Several readings were taken in succession. It was found that the pressures, both systolic and diastolic, might be highly variable in the same individual at one sitting. The systolic and diastolic curves in pregnancy showed a mean rather below the control figures, and the actual range of systolic readings was low. The systolic pressures are not higher in the last month than in previous months, but the diastolic pressure showed a tendency to rise, though not above the control figures. The lying systolic pressures ranged from 116 to 109 mm. Hg. No control figures were available. A record of over 140 mm. was found only four times in 191 records. The presence of a persistent high systolic pressure in any case should lead to careful investigation to exclude the presence of any toxic condition.

FRIDAY, JULY 24TH.

The Rôle of Surgery in the Treatment of Backward Displacement of the Uterus.

Miss Frances Ivens (Liverpool) opened a discussion on this subject. She proposed to confine her remarks to the group of cases which she described as the immobile non-adherent backward displacement. In this group were included both retroversion and retroflexion of the uterus. She challenged the statement so often made that backward displacements in single unmarried women caused no symptoms, and if present they were due to a neurosis. She had found a definite pathological condition in a large number of such cases seeking treatment, and when the lesion was remedied the symptoms had disappeared. She entirely disagreed with the view which would treat not the displacement, but only its complications, and thought it was entirely wrong to conceal from the patient the fact that such a condition was present. The speaker had found it extremely difficult to prove the causal relationship of strain to this condition, but undoubtedly

retroversion was more common in women engaged in laborious occupations. In these cases it was possible that the malposition was already present, and the strain only exaggerated the condition. She regarded the dorsal decubitus during the puerperium as the most potent cause of backward displacements. In discussing the pathological changes associated with a retro-displacement, Miss Ivens said that these changes depended largely upon congestion and back-pressure due to interference with the venous circulation in the pelvis. Direct pressure upon the rectum by the fundus of the uterus sometimes produced hæmorrhoids. The speaker then dealt with the symptomatology of the condition and quoted illustrative cases of the results obtained by operative treatment. In her opinion there were only two classes of cases where the treatment of backward displacement was non-operative. These two classes were: (1) pregnancy and the puerperium; (2) grave organic disease. The operation she practised was Mayo's modification of the Gilliam operation, and she had performed it on more than 1000 occasions with only 5 deaths. She had been able to trace 200 post-war cases. Of these 58 per cent. were cured of all symptoms, 14·5 per cent. were improved, and 15·5 per cent. no permanent benefit.

Dr. Russell Andrews (London), who followed, agreed that operative treatment was best in the following types of cases: (1) Uterus fixed and retroverted; (2) dyspareunia; (3) childless women with repeated abortions. In the majority of other cases the retroversion could be ignored, and in this category came most, if not all, single women and girls. He refused to believe that a mobile retroverted uterus of normal size could press on the rectum and cause difficult defæcation and piles. The speaker commented on the fact of how practices differed and thought Miss Ivens saw a large number of school girls the ordinary gynæcologist did not see. He had, however, looked after the nurses at the London Hospital for the past 22 years, and during that time had only seen one case of retroversion. He thought that perhaps the preliminary dilatation and curettage had a beneficial effect on a large number of the cases. In referring to the modified Gilliam operation described by Miss Ivens, he stated that he had seen several cases followed by a small sensitive swelling on each side of the scar, which sometimes turned out to be a hernia. He had never made this lateral incision, but had always sutured the round ligaments to the edge of the aponeurosis on the other side, and had never had cause to regret it.

Mr. R. H. Paramore (Rugby) gave an interesting historical survey of the various procedures adopted for retroversion. He said that intra-abdominal pressure maintained the uterus in position and this depended largely on the muscular tone of the abdominal wall. He thought that surgical treatment was of secondary importance and advised the use of an abdominal support.

Prof. W. C. Swayne said that the rôle of surgery in retroversion depended upon the position of the appendages. If symptoms were present there was always some associated pathological lesion. He discussed the functions of the round ligaments, and emphasised the necessity of restoring the anatomical functions of these structures if an operation was performed.

Dr. Farquhar Murray (Newcastle-on-Tyne) warmly endorsed Dr. Russell Andrews's able criticism on the paper. He said that he could not too strongly deprecate the practice of giving nervous young girls minute details about their pelvic organs.

Prof. E. W. Marlow said that in his experience retroversion was fairly common in young girls and unmarried women, but in the majority of these cases there was comparatively little symptomatology. In cases where marked symptoms were present there was always some degree of descent of the uterus, and in these cases it was always necessary to repair the pelvic floor. He did not think that the operation described by Miss Ivens should be called after Mayo for it was only one of the many modifications of Gilliam's operation. He did not agree about the general condemnation of pessaries, which, when fitted properly, were extremely useful.

Dr. Leith Murray said that he very rarely performed an abdominal section for this condition.

Colonel V. B. Green-Armytage (Calcutta) gave an account of his experience of gynæcological practice amongst the women in India. He believed that a large number of operations performed for retroversion were unnecessary. Miss Ivens briefly replied.

Erosion of the Cervix.

Dr. Gilbert I. Strachan then followed with a paper on the pathology and treatment of erosion of the cervix. This was, he said, the most common lesion in the female genital organs and was of special importance and gravity as a precursor of carcinoma. The pathology of the condition was discussed. The main predisposing factors were any breach of continuity in the cervix as occurred in a cervical laceration, or any alteration in the normal acid reaction in the vaginal secretion. Labour was then the usual antecedent condition, although in nulliparæ or virgins it might be congenital or due to lack of resistance to infection. Gonorrhœa might also be causal. The changes produced in erosion were traced and the possible complications mentioned, stress being laid on carcinoma. The best treatment was preventive, by giving plenty of time for cervical dilatation in the first stage of labour. Should laceration occur it should be sutured accurately if it can be seen. In treating the established condition the merits of application of antiseptics, electrical treatment, cauterisation, and vaccines were discussed, and it was concluded that it was only in slight and early cases that cure was likely to be effected. Most cases required operation, and while curettage would improve the endometritis that was often present, scraping with a sharp spoon was necessary for the hard cervix. The most effective form of treatment was found to be removal of the eroded area by the technique of Bonney. In some cases amputation of the cervix was called for, depending upon the amount of tissue to be removed, while in nulliparæ Schröder's operation was often satisfactory. While this line of treatment was radical it was the only way in which satisfactory and rapid cure could be attained, and was also an important preventive to the future development of carcinoma.

SECTION OF OPHTHALMOLOGY.

This Section met on two days, with Mr. W. M. Beaumont in the chair.

WEDNESDAY, JULY 22ND.

EYE INJURIES AND INTERSTITIAL KERATITIS.

Mr. Holmes Spicer, in opening a discussion on this subject, said that in a certain number of cases there appeared to be a connexion between interstitial keratitis and a local injury to the eye. In his experience such injuries had included a foreign body on the cornea, a "spark from the engine," chemical injury from caustic potash, surgical operation, and so forth. In 3 per cent. of the cases collected by him a direct association could be traced. In some cases the stigmata of hereditary syphilis might be absent and the question might become a most important one from the point of view of legal compensation. Harrison Butler had claimed that there was a connexion with injury in 20 per cent. of his cases, but the difference probably depended on the definition of injury. With regard to an injury being the cause of the attack, he asked how the occurrence of interstitial keratitis in the second eye was to be explained. In syphilitic patients operations such as needling and squint operations had not been followed by interstitial keratitis. On the other hand, in two cases, the condition followed very quickly on simple needling. If the organism is present in the eye there will be an attack some time or other, but the possibility of the organism lying latent for many years must not

be lost sight of. As to the possibility that the connexion with traumatism was a mere coincidence, he said that if this was the case we might expect to see cases where an injury to one eye was followed by interstitial keratitis in the other. Personally he had never seen such a case, though in the ordinary course of events the second eye was usually attacked subsequently to the injured one. He did not think the diagnosis presented any great difficulty. Typical interstitial keratitis was always syphilitic. Summing up the evidence, his opinion was that interstitial keratitis depended on the presence of the spirochæte inside the eye and its readiness for evolution. Whether or not an injury was capable of precipitating an attack depended entirely on the stage of evolution in which the spirochæte might happen to be.

Mr. N. Bishop Harman said that the important question from the legal point of view was this: Was it possible that whether, in default of any injury in any particular case, the attack of interstitial keratitis might possibly not have occurred. We must, he said, be on our guard, too, with regard to the psychological factor in all compensation cases.

Mr. Cyril Walker referred to pregnancy as a contributory factor. From the many severe and intractable cases he had seen at Bristol he recalled two especially. In one patient, a woman of 28, an attack began during a pregnancy. The second eye remained unaffected until two or three years later during another pregnancy, when that eye too succumbed. He had heard of a case following on an attack of conjunctivitis but had not himself seen one.

Mr. E. J. Primrose (Glasgow) said that in many cases of adult interstitial keratitis the Wassermann reaction might be negative. The diagnosis between syphilitic and tuberculous cases was not always easy. He advocated the arsenical treatment carried out by men who were prepared to use large doses and deal with any emergency that might arise.

Mr. Inglis Pollock laid stress on the urgency of antisyphilitic treatment. In two cases of interstitial keratitis following an injury to the cornea—both of them typically syphilitic—as the result of prompt arsenical treatment the second eye did not become affected.

Mr. A. W. Ormond recalled his experience during the war at a large hospital where many cases of traumatic corneal ulcer were treated. In as many as 10 per cent. of these cases an attack of interstitial keratitis supervened. The diagnosis between syphilitic and tuberculous keratitis was perfectly possible. Treatment was now far more important than it used to be 25 years ago. At that time mercury did not cure. It was different with modern arsenical treatment.

Mr. R. Wallace Henry spoke of a case of interstitial keratitis alleged to be the result of the administration of an anæsthetic.

Dr. de Schweinitz gave it as his opinion that an injury might lower resisting power, but in no other way could cause an attack of interstitial keratitis.

Mr. Bishop Harman read a paper on

Phlyctenular Conjunctivitis and Keratitis.

He said that in a total of 3300 children who had passed through the schools for the blind and the myope classes in London there were 699 whose disability was caused by inflammation of the superficies of the eyes. Of these 367 had suffered from ophthalmia neonatorum, 90 from purulent conjunctivitis of later years, and 242 from phlyctenular keratitis. Of these 242 cases 69 had such badly damaged eyes that they needed to be trained in schools for the blind. The proportion of total blindness in school-children caused by this disease was 3·56 per cent., while if we add to them the number of children with sight so damaged that they had to be educated in the myope classes, the percentage reached 7·3 of all included in the two types of school.

In discussing the ætiology, he said that it was a disease of the poorer classes, being rare in private practice. Comparing two classes of hospital patients, native and Jewish, it was found that phlyctenules were three times as common among natives as among Jews. The only factor accounting for these two contrasts is the food factor. Children of the middle class were well fed, and so were the children of alien Jews on a diet into which oil largely entered. Both these classes escape the ravages of phlyctenular disease. With regard to age incidence, he said that the frequency increased from the second year of life to the fifth, declining in later years. The state of the mouth in poor children of about 5 was apt to be worse than either earlier or later. The initial lesion was more commonly found in the lower and outer section of the limbus. More than half of the cases observed began in this situation or on the cornea adjacent to it. The nerve-supply of this area was derived from the loop formed by a twig from the lacrymal nerve and from the second division of the fifth, so that irritation within the mouth would explain the occurrence and situation of the eruption. The link of connexion with the lacrymal nerve similarly accounted for the profuse lacrymation that occurred. Unbroken phlyctenules were sterile so that it cannot be contended that the disease is due to microbic infection. Unlike contagious forms of conjunctivitis, phlyctenular disease was not specially rife during the spring and summer months, but is fairly evenly distributed throughout the year. The typical phlyctenule had a fluid content. The early investigators who considered it to be of the nature of a blister were right. These points of evidence converged on the general conclusion that the disease was a manifestation of some general disability and not a specific infection of the tissues of the eye.

With regard to the connexion with tuberculosis, the evidence for this, he said, was very slight. Of the 242 cases of phlyctenular disease already referred to, only eight had tuberculous lesions. Of 81 cases seen more recently only one showed any infection with tubercle. The evidence went to show that the primary general condition is not tuberculous, but feebleness due to lack of proper food and perhaps also lack of sun and air.

The prevention of this disease was bound up with the general social betterment of the people. Among factors making for this were the school medical service, by means of which cases requiring general or local treatment were discovered; open-air schools, dental and throat treatment, and the transfer of serious cases to country hospital schools through such an arrangement as there was in London between the County Council and the Metropolitan Asylums Board. Though these measures involved an immediate expense, when the saving in effective citizenship was considered they could not fail to be an ultimate economy.

A Light Recorder.

Mr. Wallace Henry demonstrated an instrument for recording light minimum and light difference. It was a somewhat elaborate piece of mechanism, but by its means he had made this interesting observation in regard to light adaptation. There might be a difference in the two eyes of as much as 50 per cent. in the time taken for light adaptation, even in cases with normal light difference and normal light minimum.

Mr. A. S. Percival referred to his own simple clinical device of revolving discs for testing light minimum and light difference. As an instance of its practical utility he recalled the demonstration of a defective light minimum in a case of cataract in which he had discouraged operation on the ground that there was a probability of a macular affection. On the patient's subsequent appearance after an operation properly performed elsewhere but resulting in no benefit to the sight, Mr. Percival found his diagnosis confirmed.

Mr. R. Colley showed a case in which, as the result of an accident to a medical man, a piece of glass 7 mm. long could be demonstrated lying behind the lens and apparently doing no harm, the vision remaining at 6/5. Several more or less similar cases had been recorded.

THURSDAY, JULY 23RD.

On the second day Mr. Freeland Fergus opened a discussion on

Ocular Pain.

Two main causes, he said, were: (1) Uncorrected refraction, defects of accommodation, and muscle balance; (2) septic infection. In the first category he placed cases when there is difficulty in retaining parallelism on distant vision owing to a defective power of the external recti. In the latter he included pain following operations due to defective technique. Corneal ulcers were best treated not by atropine and bandaging, but by pilocarpine, frequent douches, and dark glasses.

Mr. Wallace Henry referred to reflex pain from decayed teeth. He remembered a case in which severe pain in the eyes was caused by defæcation. As a douche in operation cases he used 1 : 4000 acriflavine.

Mr. Bishop Harman referred to heat as our most valuable remedy in dealing with ocular pain.

Mr. A. S. Percival referred to the use of dionine.

Dr. Webster Fox pinned his faith to leeches, belladonna, and poppyhead fomentations and salicylates. He spoke favourably of milk injections (3 c.cm. to favour leukocytosis) and daturin instead of atropine.

Mr. Lindsay Rea read a paper on the

Treatment of Ocular Syphilis.

This paper, he said, was a plea for the prompt and energetic treatment of cases whether acquired or congenital. As an example of the former he displayed on the screen photographs of a young man who developed an alarming proptosis while on his honeymoon. The proptosis increased from day to day. It was directly forwards and there was limitation of movements in all directions, diplopia and pain. The pupil reacted to light, but vision was reduced to 5/60, and subsequently the eye became temporarily blind. There was very marked conjunctival œdema. At first one eye only was affected, but in the course of two or three weeks the second eye also became proptosed. Vision rapidly deteriorated in both and the eye first affected became blind. Meantime the Wassermann reaction was found to be strongly positive, and thereupon the patient was put on injections of novarsenobillon, 0·45 g. every fifth day for eight weeks. After two or three injections the proptosis began to diminish and the vision began to improve. Iodide of potash in 25 gr. doses was also given thrice daily and mercurial inunctions. At the end of three months the vision was 6/6 in each eye and the proptosis had entirely disappeared. It was a case of gummatous infiltration of both orbits rapidly responding to treatment.

Turning to congenital cases, Mr. Rea discussed first the diagnosis and then the treatment of interstitial keratitis. In 72 of his cases the Wassermann test was done. Of these cases 64 were new ones, and in every one of them the Wassermann reaction was positive. In eight old cases it was negative, but in five of them where he was able to get an examination of the cerebro-spinal fluid, although the Wassermann was negative, a luetic curve was obtained by Lange's colloid gold test.[1] He had not found a single case of typical interstitial keratitis which was not syphilitic.

In the case of adults he used N.A.B. injections, beginning with 0·3 g. and rising to 0·45 g., or in some cases to 0·6 g. In the case of children under 10 he used just half these doses and withheld mercury during the period of injections. Ten or 12 weekly injections were given, and under this treatment the results obtained were far better than under the old treatment with mercury and iodide of potash. Moreover, in 63 consecutive cases of interstitial keratitis treated with arsenical injections not a single case of deafness had developed. With regard to the duration of treatment with arsenical injections, it varied from four and a half to eight months. In cases where the veins of a child were difficult to find, Mr. Rea recommended the intramuscular injection of sulpharsenol into the buttock—6 cg. weekly.

The value of Lange's colloid gold reaction in establishing the diagnosis of syphilis was shown by a case of retino-choroiditis with negative Wassermann, both of the blood serum and cerebro-spinal fluid. The colloid gold test showed the luetic curve. Treatment with mercury and iodides arrested the disease and vision in one eye rose from 6/24 to 6/6. An interesting observation, in which Dr. Rayner Batten concurred, was that affections confined to the macula were not due to syphilis, although the macula might become affected in generalised syphilitic affections of the retina. In cases of congenital syphilis the Wassermann reaction was misleading. In old cases it may become negative without treatment, whereas in recent cases, in spite of efficient treatment, it might remain positive. If cases of ocular syphilis were treated vigorously with such preparations as novarsenobillon the results, although not dramatic in suddenness, were consistently good.

Mr. A. W. Ormond read a paper on

Visual Hallucinations of the Sane.

In some cases of hemianopia visual hallucinations appeared only in the half field. They depended on visual memories and the faculty of visual memory differed enormously in different people.

Mr. Wallace Henry recalled a case of distressing visual hallucinations in a patient with both eyes excised which was cured by 1 per cent. cocaine applied to the stump of the nerve in the socket.

Mr. J. Burdon-Cooper read a paper on the

Conservative Treatment of Glaucoma.

Some underlying causes of glaucoma were depression and worry, high blood pressure, errors of metabolism, intestinal troubles, and acidosis. To combat congestive attacks he advocated warm baths, the hypodermic injection of ¼ g. of morphia twice daily, and the administration of nitro-glycerine, ℥i. every four hours, dry heat, scarification of the temple, and pressure massage, which last measure might reduce the tension. These measures were intended not as a substitute for, but as a supplement to operative treatment.

[1] THE LANCET, 1920, ii., p. 688.

New Inventions.

OPERATING BOOTS.

THE operating boots here illustrated are the outcome of an attempt to obtain a legging which could be worn if desired over outdoor shoes, stand repeated sterilisation by dry or moist heat, be easily kept in place, and wrap up into small compass. The sole of the boot is made of special rubber, which is unaffected by boiling or steam, and the upper is of white coutil, which washes well, and is attached to the sole by hand-sewing, without the use of any rubber solution. The single long tape in front allows the boot to be attached to a front brace button, and the ankle tapes tied over the instep keep the foot portion in place. I have had one pair in constant use at hospital for the last nine months, and they show, as yet, no signs of wear.

I am much indebted to Messrs. Allen and Hanburys, Wigmore-street, W. 1—from whom the boots can now be obtained—for the trouble they have taken in finding the right materials to meet the objects I had in view.

ERIC PEARCE GOULD, M.Ch. Oxf., F.R.C.S. Eng.

Reviews and Notices of Books.

OFFICIAL HISTORY OF THE CANADIAN FORCES IN THE GREAT WAR, 1914–19.

The Medical Services. By Sir ANDREW MACPHAIL, Professor of the History of Medicine, McGill University. Published by authority of the Minister of National Defence. Ottawa: F. A. Acland. 1925. Pp. 428.

A CURIOUS and interesting book; an official history of the medical services of Canada in the war, yet prefaced by an official notice that "the opinions expressed are those of the author himself." The author confides to us some of the difficulties of the Canadian Medical Corps, sometimes caused by "the Imperials," but in the first half of the war the greatest difficulty of all was, he tells us, the Minister of Militia. And no doubt the Minister, like others, was far from perfect; he considered himself a universal expert, misunderstood and misjudged the work of the Medical Corps, naturally embroiled himself with his professional advisers, fought then for himself rather than for the service, and had to resign. Yet it should not be forgotten that "Sam," as he was known all across Canada, had seen the menace of Germany far sooner than most people, had prepared against it with ability, and, in Parliament at Ottawa in 1910, had given publicly to Lord Roberts the credit for foresight which so many smaller people were denying him. He also worked hard to send quickly overseas the 30,000 Canadians of the first contingent.

To the surprise of the War Office "the equipment brought with them was largely worthless and had to be replaced" (p. 29) from British ordnance and medical stores, and their training was still to come; so, though soldiers were badly wanted in France that winter, this division could not be sent across until February, 1915. The author is of opinion they might have been made more quickly battle-worthy in Canada, but in England they were closer to the real school of war, France, and were besides, through that depressing winter, a convincing evidence of the solidarity of the Empire. Once the division did get to France the credit of the Canadian troops was quickly established and soon grew to a great renown, not earned without sacrifice. Of 418,052 Canadians overseas, 51,678 (123 per 1000) were killed or died of wounds, 4960 (12 per 1000) died of disease; a heavy toll of her best which Canada still mourns. The chapters describing personal experiences of various medical officers and units are delightful reading. With his experience of the early confusion and the later orderliness of the war, why did the author not provide an appendix telling the newly volunteered medical officer on what duties to concentrate in the first days of a general mobilisation when all is strange and new, and conservancy and infectious diseases require particular care?

Medical units were, very properly, the earliest to reach the great first Canadian camp, Valcartier, and the subsequent development of the Canadian Medical Corps is carefully recounted and the diseases of the war are discussed. Venereal diseases were a great trouble though not, strictly, diseases of the army, being always contracted from civilians, outside the army. "Idleness is the mother of lechery" is the author's aphorism, from which we may deduce that the best disciplined troops should show a smaller venereal rate. The author agrees with the Official Medical History of the War that it is not yet known whether preventive measures and/or early treatment have really prevented infections from developing, but he reports the experience of the Canadian Corps with some hopefulness. Any man if infected had to disclose where the infection was contracted, and the woman was deported from the area, and, so long as there was no leave, one case only appeared per day among 30,000 men, the usual rate being three or four times as much.

The work must be read as a whole, as its parts are not everywhere consistent. Thus, on p. 306, we are told that "the food at all times was abundant and unfailing," though on p. 296 the food of No. 3 Stationary Hospital at Mudros was stated to have been "scarce and unsuitable for the personnel, impossible for the patients." Marvellous things happen in war, but who would have believed that horse lines, "the best in the army," so Field Marshal Plumer described them (p. 54), were designed by the Mother Superior of a Belgian convent!

CLINICAL THERAPEUTICS.

In two volumes. By ALFRED MARTINET, Paris. Authorised English translation from the second revised and enlarged edition, by LOUIS T. DE M. SAJOUS, Philadelphia. Philadelphia: F. A. Davis Company; London: Stanley Phillips, 45, Brondesbury-road, N.W. 6. 1925. Pp. 718. Price for the two volumes, 67*s*.

THE author in his preface styles his book "a manual of practical medicine, based on an essentially novel plan conforming to the actualities of practice and meeting clinical requirements." He points out that it is a complement to an earlier work entitled "Clinical Diagnosis." It is a bold claim that any book on medical treatment can be essentially novel, but that it conforms to the actualities of practice we are willing to admit. It is wide in its scope and excellent in its material. A medical student cannot possibly, in his short time in the wards, see all the processes used in the treatment of patients. But according to luck, and to a persistence in being present at times apart from the rounds of his chief, he may see many things he would only learn as a resident or not at all.

This book, besides giving many useful helps in drugs, tells in detail how the student must do those things which he has heard of and not seen, or has only seen done by someone else. The first part, the therapeutic agents, is divided into medicinal, alimentary, physical, and psychic agents; medicinal agents are again divided into (1) drugs acting on a definite function, and (2) those acting selectively on infectious and parasitic disorders. This last part, including serum therapy and chemotherapy, forms a section which is especially useful. Drugs acting on organic function are subdivided according to the system of the body in which they act principally and the best known one of each class is taken as a type. Pharmacology and chemical structure is touched on sufficiently to give the raison d'être of many of the drugs.

In the second volume, dealing with symptomatology and treatment, Dr. Martinet lays great stress on the importance of avoiding "equation therapeutics," but gives a very comprehensive 200 pages of common symptoms arranged in alphabetical order, with remarks on the various conditions they may indicate and the appropriate treatment. His fourth section, the treatment of disease, he divides into diseases of the various systems, metabolic, infectious and venereal diseases, skin, ear and eye diseases, and treats their subdivisions in systematic detail. He has made more use of his collaborators here, and whole sections are written by specialists in their particular diseases. The author's article on the treatment of poisoning is very well arranged and employs the tabulated method for quick reference, and his final chapter on instructions to the patient contains a great deal of matter that few general practitioners could read without a certain feeling of shortcoming. He insists that full dietary, hygienic, and physiotherapeutic instructions should be given not only verbally but also "legibly written on good paper"—an excellent rule, if perhaps a counsel of perfection.

Generally, the book is a direct translation from the French. The section on watering places has been liberally adjusted to the American reader, and the writer (or translator) is somewhat unfortunate in selecting Epsom as a place in England known for

its purgative mineral waters. The book abounds in long words not in common use in English medicine, of which hypocrinic, crenotherapy, crymotherapy, inoscopy may be taken as samples, and in many respects it is tuned up to the American rather than the English reader. It is a valuable compilation.

THE HEALTH OF CHILDREN.

Health in Childhood. Five Lectures delivered at the Institute of Hygiene. With a Foreword by A. MIDDLETON HEWART, M.D., D.P.H. London: G. Bell and Sons, Ltd. 1925. Pp. 94. 2*s.* 6*d.*

Healthy Childhood between Infancy and School Age. By MARY E. WESTON, M.B., B.S. Lond., Assistant School Medical Officer and Assistant Infant Welfare Medical Officer, County of Leicester. London: Faber and Gwyer, Ltd. (The Scientific Press). 1925. Pp. 135. 4*s.*

IT is a mistake not uncommonly made to assume that one has only to write down the elements of hygiene for children in simple language and any mother will then be able to read, understand, and put these rules into practice. The subject has to be approached and explained in almost as many different ways as there are mothers, so that books on child welfare with an original outlook are still welcome. The first of these two volumes consists of five lectures on somewhat less popular and certainly less known aspects of the subject. Lieut.-Colonel Robert H. Elliot writes with all his well-known authority on the care of the eyes in children; Mr. George Thomson on the care of the primary teeth; Dr. King Brown on the prevention of infectious disease in childhood; the late Mr. Græme Anderson on the prevention of deformities in children; and Dr. C. S. Thomson on the mental and moral education of the child. All these papers, which were lectures delivered this year at the Institute of Hygiene, are of a high standard of excellence and demand the careful attention of all those dealing with the care of the young.

Dr. Mary Weston is concerned with the health of the toddler or pre-school child, a subject about which not much has been written in this country, although, and despite what Dr. Feldman says in his foreword, there have been several excellent volumes published in America. After a brief introduction the author deals successively with the diet, clothing, sleep, physical development, the air and sunshine requirements, the training and the holidays of the child between the period of infancy and school age. Two chapters are added on the child in sickness and on some common diseases. Well written, with much common sense, this book should have a wide appeal.

TOXIC GOITRE.

Kliniske Studier over Thyreotoxicosenes Diagnose og Prognose. By Dr. JOHAN HOLST. Oslo: Jacob Dybwad. 1924. Pp. 96.

WITH the financial assistance of the Fridtjof Nansen Fund, Dr. Holst has published a monograph which embodies his study of 150 cases of Graves's disease or Basedow's disease—terms which he prefers to discard in favour of the more modern expressions thyreotoxicosis or toxic goitre. He attaches a certain value to the Goetsch adrenalin test, Kocher's cytological formula, the blood-corpuscle suspension test, the sugar-tolerance test, and de Quervain's rat test, but it is the basal metabolic rate, as determined by Krogh's method and apparatus, on which he relies most for a diagnosis. He does not, however, undervalue the clinical examination. The term "latent thyreotoxicosis" is used by the author in connexion with those cases in which the metabolic rate is increased, although there are no clinical signs of the disease. It is probable that the patient who suddenly develops Graves's disease after a fright has been for some time suffering from latent thyreotoxicosis. For it is difficult to explain how the organic changes of Graves's disease could develop suddenly as a sequel to psychic shock. As the author points out, a knowledge of latent thyreotoxicosis is of great importance to the early diagnosis and treatment of the case.

Dr. Holst gives an interesting account of cases of monosymptomatic thyreotoxicosis, the patient suffering from neurasthenic symptoms only, or only eye symptoms or diarrhœa. Or the only symptoms may be referred to the heart. It is in such cases that the clinical diagnosis is apt to be wrong, and the determination of the basal metabolic rate is of unusually great importance. It is also very helpful in distinguishing between neuroses and thyreotoxicosis, for if the metabolic rate is found to be normal the patient is certainly not suffering from hyper-function of the thyroid gland. But if there is an increase of the metabolic rate by 25 to 30 per cent., thyreotoxicosis probably exists, although in neuroses also there may sometimes be a slight rise of the metabolic rate. With regard to operative treatment, the author is in favour of early radical resections in order that the proliferation of the toxic cells may be arrested before irreparable damage has been done to the heart or other organs. When symptoms persist after an operation, a determination of the metabolic rate will show whether they are due to an insufficient removal of diseased thyroid tissue or to secondary lesions in other organs, and thus the metabolic rate helps the surgeon to decide for or against another operation. It is again the metabolic rate by which the surgeon should be guided in the worst cases, and when this rate is more than plus 70 per cent. the author considers surgical treatment as dangerous.

The chief message, then, of Dr. Holst's admirable monograph is the value of the metabolic rate to the study of almost every aspect of Graves's disease.

PRACTICAL PATHOLOGY.

Including Morbid Anatomy and Post-mortem Technique. Second edition. By JAMES MILLER, M.D., D.Sc., Professor of Pathology, Queen's University, Kingston, Canada. London: A. and C. Black. 1925. With 109 figures. Pp. 528. 15*s.*

WE do not wonder that a second edition of this book, first published in 1913, has been called for. It does what it sets out to do very well, and gives a plain, easy, straightforward account of what the elementary student of pathology wants to know about his work in the post-mortem room. Eminently practical directions for making autopsies are interspersed with brief descriptions of morbid appearances and their meaning, and at the end a section is devoted to the methods of preserving and examining tissues. Prof. Miller gives one good way of doing each thing, which is educationally a far sounder plan than providing a maze of alternatives. It is certainly better to be able to cut up a body and display the organs neatly according to some definite and familiar plan and to be able to stain a section really well with hæmatoxylin and eosin than to half know three ways of performing a necropsy and ten ways of staining a section. There are, of course, plenty of small points in which each working pathologist who reads the book will be sure that the method recommended is not really the best—it is cosmetically preferable to open the neck by two incisions from the mastoid processes meeting at the top of the sternum than by a single median cut (Fig. 4); it is more elegant in v. Kossa's method (p. 434) to develop the silver phosphate with pyro than to rely on sunlight; rubber gloves are handier in use if one wears a pair of thin cotton gloves over them (p. 5); there is more to say about the ætiology of rickets than is found on p. 326—but there will be plenty of time for the student to learn some of these variants when he has really mastered some one way of doing what is requisite and necessary.

INDUSTRIAL POISONS IN THE UNITED STATES.

By ALICE HAMILTON, M.D. New York: Macmillan Company. 1925. Pp. 590. 21*s*.

THE writer of this volume is an international authority who has made the matters discussed her own speciality and has visited many countries in the course of her studies. In some ways the title chosen is somewhat misleading, since, although the objective is industrial poisons in America, the information amassed is drawn to no small extent from investigations made in Europe and particularly in Great Britain. The scope of the book is strictly limited to recognised industrial poisons, such as lead, mercury, arsenic, caustics, acids, vapours and gases, and benzene compounds; but what determined the inclusion of troubles from oil and tar cancer, while the toxic silica is omitted, is difficult to guess. Further, there is no reference to caisson disease, which is well known in the United States, and might usefully have been grouped with gassing. If limitation of space was the determining factor, condensation might have been exerted relative to lead poisoning, which receives the lion's share of space; indeed, it accounts for nearly half the volume. Lead poisoning has in the past truly led the way in industrial toxicology, but its causation is now so well understood and its frequency is so rapidly diminishing, that the time has come to place it in more correct perspective. Nevertheless, the exposition given is likely to become for some time the standard for reference.

The scheme adopted is to state for each poison first a description of its symptoms and pathology, and then of the risks as they occur in industry. Long technical explanations of processes—all too common in books on this subject—are commendably avoided; and chemical questions are only introduced when required to display a connexion between molecular structure and toxicity. Prevention of risk is only incidentally discussed in connexion with causation, while treatment is entirely omitted. This omission, particularly in regard to such things as gassing with carbon monoxide, seems unfortunate.

On the whole, the book is readable and well written. It places at the disposal of those interested a wealth of information in ordered sequence.

ELECTRICAL CONDUCTIVITY OF THE HUMAN BODY.

La Conductibilité Électrique du Corps Humain. By ANDRÉ STROHL, Docteur-ès-sciences, Professeur à la Faculté de Médecine d'Alger. Paris: Masson et Cie. 1925. Pp. 128. Fr.8.

Dr. Strohl has conducted original research on the electrical conductivity of the human body. By means of a ballistic galvanometer he has been able to determine the resistance of the tissues at the moment when the current commences to flow and for minute fractions of a second after. With the apparatus at their disposal, previous workers have not determined the resistance at such early periods of the flow of the current. When a current at constant voltage is used, Dr. Strohl has shown that the resistance of the body rises, during the first few thousandths of a second, to a value two to five times greater than that found when the current has passed for longer periods. After this initial increase it falls, at first quickly, and then more slowly, till it reaches the values obtained by earlier workers. The author regards this initial rise, the existence of which has not hitherto been known, as the result of an E.M.F. acting in a direction opposite to that of the measuring current and produced by polarisation. This polarisation increases at the moment when the current commences but then diminishes slowly. It takes place throughout the tissues traversed by the current, but mainly in the skin. It is determined by the varying permeability of the cell membranes to the tissue-ions and it disappears, in part at any rate, when the integrity of the membranes is lost. The author thinks that the degree of permeability depends upon the nervous system, probably the sympathetic.

Dr. Strohl's work is of high scientific value. It shows that the polarisation of the tissues, causing as it does considerable variations in the strength of the current produced by a constant E.M.F., constitutes a source of difficulty in the measurement of tissue excitability to currents of short duration, and a possibility of error in the determination of the chronaxie. The author thinks that further study of the opposing E.M.F. caused by the polarisation, and the initial resistance of the tissues would yield information of value in the study of certain functions of the tissues.

ALCOHOL IN MEDICAL PRACTICE.

By COURTENAY C. WEEKS, M.R.C.S., L.R.C.P. London: H. K. Lewis and Co., Ltd. 1925. Pp. 186. 3*s*. 6*d*.

THE object of this little book is to show that although there has been a remarkable decrease in the use of wines and spirits in various hospitals and institutions within recent years, there is still room for even further decrease, if the use of alcohol as a drug be removed from the realm of empiricism and treated scientifically on its pharmacological merits. Dr. Weeks claims that his conclusions have been reached by a "careful consideration and appropriation of much that has been written during the past thirty years." These conclusions would carry more conviction to his professional brethren if some of the rhetorical utterances, which the author no doubt has found useful in public lectures, were curtailed, for they obscure a scientific analysis of the subject. Nevertheless, many of the arguments are very sound, and the tabulated results of an inquiry into the comparative amounts of alcohol used in various hospitals and other institutions in the years 1900 and 1923 are very instructive. One point, and not an unimportant one, which Dr. Weeks ignores, is the undoubted psychological effect of alcohol taken in even small doses by patients in the belief, erroneous or otherwise, that it is doing them good. A chapter on the evolution of medical opinion has been added and is very interesting reading. Dr. Weeks writes well and in a convincing manner, and perhaps this volume will be of some assistance in enabling those of "our professional brethren who have been so fast bound in the shackles of the past to emancipate themselves and their patients into the greater freedom of a newer knowledge." But this is one of the passages which the book would be better without.

ANATOMISCHE PRAEPARIERUEBUNGEN.

By HANS VIRCHOW. Curs I. and II. Berlin and Leipzig: Walter de Gruyter and Co. 1924. Pp. 66 and 110. M.5.50.

THIS is a guide for anatomical students, telling them shortly what they are expected to display, but not saying much on the subject of carrying out the intention. The first "Curs" is concerned with the muscles only, and the arm takes seven pages in this connexion. The fullness, comparatively, of the sections on the post-vertebral muscles seems to us rather remarkable, for one would imagine it more profitable to expend effort so relatively great on more worthy subjects; moreover, these muscles are among the easiest to teach in the body. Similar remarks might be made on the treatment of the face. These little books are not for teaching anatomy but for guiding the learner, but even from this point of view they are the curtest with which we are acquainted, though little human touches appear here and there among the short directions which may give pleasure to a worried reader. There are simple diagrams to show incisions and broad margins and spare pages for notes. The printing and appearance of the book are excellent.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 5, 1925.

AN IDEALIST ON MODERN SCIENCE.

THE British Association for the Advancement of Science held its annual meeting at Southampton last week, and on August 26th Prof. HORACE LAMB, F.R.S., delivered his presidential address. As a mathematician, he confessed that he found it difficult to choose a subject in which he had himself been interested without overstraining the patience of his audience, but he was equal to the test. He spoke on geophysics, a subject of intense interest to everyone of whatever education, and confined himself to facts of the earth's constitution that have been gathered from observations made in our own time, and mainly those that bear a mathematical or physical significance. Before he came to the subject-matter of his address, however, he reminded the Association of some general truths concerning science that cannot be repeated too often. He said that to the question "What is the real purpose of science, and what is the common inspiration of scientific effort and the common ambition of scientific workers?" there is a kind of stereotyped official answer, given in a formula that has become almost consecrated—viz., "To subdue the forces of Nature to the service of man." In other words, the only real value of science is as a key to the material gains and the larger powers that have in the last two centuries so transformed the external part of our lives, and since there is no knowing what abstract research may not prove in the future to promote the supreme end, the more speculative branches of science are to be not only tolerated, but to a certain extent encouraged. Now this Prof. LAMB rightly held to be only a part of the truth. Practical utility has undoubtedly been the conscious aim of much scientific work, and sometimes perhaps its main justification, but the Association would not admit that this formula adequately described what had really inspired discovery through the ages. The conic sections of Apollonius were to him not a possible future guide to the motions of planets, but a study that was legitimate and respectable in itself; and FARADAY and MAXWELL, feeling their way towards an electric theory of light, had no prescience of wireless telegraphy, though this was a development of their researches by no means remote.

For the British Association the primary aim of science must be to explore the facts of Nature, to ascertain their mutual relations and to arrange them as far as possible into a consistent and intelligible scheme. This is the true inspiration of scientific work, as success in it is the appropriate reward. The material effects come later if at all, and often by a very indirect path. In this constructive task, the President saw a very distinct æsthetic motive, and he showed in a fascinating piece of argument that the research worker was really as much an artist as the musician or the sculptor. A well-ordered piece of algebraic analysis is very like a musical composition. To the uninitiated it is merely a mass of curious symbols, but so is the score of a symphony, and in both is shown that purposeful evolution of a mass of unrelated elements into a grand harmonious unity, that marks the working of the universal creative life. Enthusiasts are using a perfectly true analogy when they speak of the poetical charm of LAGRANGE'S work or the classic perfection of MAXWELL'S expositions, and the interest men find in the latest achievements of physical science should be not so much due to the hope of future profit as to the intrinsic beauty and novelty of the visions unfolded. Nevertheless, it would be disloyal to science, said Prof. LAMB, to depreciate the material advantages that it has bestowed on civilisation. The most utilitarian result is based on long and patient study and experiment, and science is also greatly indebted to industry for the impulse it receives from new problems and the extended scope that industry opens for its experiments. The National Physical Laboratory, started mainly in the interests of industry, is now, as Prof. LAMB pointed out, a great institute of theoretical as well as applied science, informed throughout by the true spirit of research. In speaking of HUXLEY in connexion with the increased intellectual freedom of to-day, the orator defended science against the criticism that arose from the disappointment of those expecting it to reform human nature, a criticism that President WILSON has expressed forcibly by the words, "Science has won us great liberty in the physical world but has not freed us from ourselves." It is not in the province of science to improve human nature. Science can give the gifts, but cannot bear the responsibility for their use by the human race. It can take its rightful place in our sports, as Prof. A. V. HILL shows well in his address to the Physiological Section of the Association (see p. 481), but it cannot prevent the abuses of too much play. Medical science has given us longer and healthier lives, but is not responsible for the use we make of them. It benefits both the just and the unjust, but we would not on that account close our hospitals or condemn our doctors.

Prof. LAMB then set forth some very interesting facts about geodesy, and the results of the latest researches on the shape and constitution of the earth, its rigidity and elasticity, and the forces that act upon it, and closed on a note of tribute to the great part that local universities and university colleges have played during the last 50 years in developing science in this country and the empire. He referred to the new schemes by which the University College of Southampton were now increasing their activity and furthering their development, and wished them every prosperity in the name of the British Association. Science has never been so widely and so enthusiastically cultivated as at the present time, with so complete sincerity, with more brilliant success or even with less of international jealousy: Prof. LAMB'S words to this effect can fairly be re-echoed by those who pursue medicine.

THE INDIAN MEDICAL SERVICE.

LAST week, in the Students' Number, we essayed to place before the medical schools a picture of the Indian Medical Service which would enable those who were choosing a career, and their advisers, to judge what the opportunities really are in the Service—both what are the drawbacks which have ensued on the great political changes of recent times, and what are the advantages which may be secured to the members of the Service under the various schemes put forward to deal with an admittedly difficult situation. How difficult was well elicited recently in the House of Lords when Lord SYDENHAM asked the Secretary of

State for India "whether measures are in contemplation adequately to fulfil the medical requirements of the Indian Army, British residents, official and non-official, and the civil hospitals, and to secure the progress of modern science in all its branches throughout India." In support of his inquiry Lord SYDENHAM reviewed briefly but eloquently the magnificent work that has been done for many years by the Indian Medical Service; he did not say a word too much when he claimed for it the position in the past of the finest public medical service ever created. The justification of this praise is to be found not only in the standard of health which has always been maintained in the Indian Army to which the Service specially ministers, but in its achievements on the civil side whereby a hospital system has been spread over the Indian Empire, and a directive force produced for the support of all that may be called sanitation in the country. When statements like these can be made unchallenged—and identical sentiments have been appearing in our columns for the last three-quarters of a century—no one can look upon a complete revolution of such activities with anything but sincere regret. But the idleness of tears is well replaced by constructive energy for the future. India definitely requires European medical assistance, not only for the care of the military and civil European populations, but for the maintenance in the country of that spirit of modern medicine which has accomplished already such mighty things, and which day by day is spreading in influence and value. It is a national responsibility to meet the requirements.

We need not recapitulate here the recommendations, now some eight years old, of the Royal Commission on the Public Services, nor those of the Verney Lovett report, for they have all been thoroughly discussed. The practical point is how far the last concessions under the recommendations of the Lee Commission will offer attractive terms for young medical officers and will at the same time provide in India for the three things which are seen to be essential—namely, the maintenance in India of modern standards of medicine, the conservation of the health of the military and civil Europeans, and the due care of their families resident in India. The answer to this far-ranging question was to some extent supplied by the Secretary of State for India in his reply in the House of Lords to Lord SYDENHAM'S request for information. The Lee Commission, Lord BIRKENHEAD explained, had taken the same line with the Indian Medical Service as with the other All-India services in dealing with what are termed the "transferred subjects." By the Commission it was proposed that the R.A.M.C. should absorb the I.M.S., but the conclusion has since been reached that the I.M.S. ought to remain as a military service, its reserve being secured from the officers lent to the civil administration. The recommendations further proposed that the Provincial Governments in India should in the future recruit and control the services for whose work they were responsible to their legislatures; but here the Secretary of State pointed out that in the case of the Indian Medical Service the general principle is limited by the considerations that the needs of the Army would have to be met by drafts from the Civil Medical Service—a service 50 per cent. Indian recruited—while special arrangements would be made to obtain medical attendance for European residents by British medical men. But efficiency in such attendance may be difficult to secure, and there does not seem any stronger appeal inherent in the work than we have been able to put forward last week. Good men will make their presence felt and appreciated, but unless the districts are limited there is much chance of wasted effort. Lord BIRKENHEAD inclined to the belief that it will be essential to earmark for the portion of the Army Reserve lent to the civil side, but not required directly for the medical care of the British Services, a number of civil positions, and he instanced research or professorial appointments. These appointments have always been attractive to officers of the Service, and, said Lord BIRKENHEAD, "if the essential Army Reserve maintained in civil employment allows a margin (as it almost certainly will) it is clearly a gain not only from the point of view of recruiting inducements, but to Indian public health generally that the men should be employed in the departments of research and teaching in which their predecessors have done so much for the welfare of India."

At any rate the period of inactive regret seems to have passed, and a general conclusion reached that there is a fine future before the Indian Medical Service, even though vast alterations in the world, mainly of modern origin, have brought with them a revolution in the conditions of work. Those who enter the Service now, no less than the pioneers of medicine in India a century and more ago, will have before them a great constructive task. Their predecessors tilled virgin soil. The present soil, though much remains untouched, has in the great essentials been cultivated and cultivated successfully, but under methods which in detail will no longer be pursued. Success will none the less come to the Service while its great ideal remains of promoting in India, for Europeans and Indians alike, the principles of health and sanitation. Medical science should know no difference between races, but it cannot, out of unbounded tolerance, be called upon to countenance mysticisms and superstitions. The work of the vaids and hakims, and the antique theories of indigenous medicine will give place in time to scientific procedures founded upon anatomy and physiology, upon observation, experiment, and research. Much tact will be required to persuade many millions of uneducated persons to look to science for their salvation, and the early energies of the Indian Medical Service in the future may have to be devoted, apart from their definitely official duties, to the education of the community through qualified Indian doctors.

THE RECOVERY OF THE LONDON HOSPITALS.

THERE is much that is comforting and encouraging in the annual report of King Edward's Fund upon the work and finances of the 118 London hospitals during 1924 which has just been issued. Not the least significant of its masses of figures are those which show that the number of beds has grown by 350 during the 12 months—practically a new bed every day—and that the number available in London is 1620 more than in the year before the war. With the very recent report of the Voluntary Hospitals Commission on bed capacity before us, it is obvious that the accommodation is still much too small, but so substantial a growth in a single year is a remarkable indication of the resiliency of the voluntary system. Income has kept pace with expenditure in an almost exact ratio—both are, roughly, double what they were in 1913. When, however, we compare 1924 with 1923 we find that maintenance expenditure has gone up £123,000 whereas income has increased by less than half that amount. Nevertheless, the aggregate deficits of 1920, 1921, and 1922 have, during the last two years, been changed into aggregate surpluses, and the number of hospitals with deficits fell from 77 in 1920 to 54 in 1924. That is still far too many, yet if the present rate of

progress can be continued, in another few years minus quantities will be almost unknown in London hospital finance. The need of money for building, equipment, and endowment remains, and is likely long to remain, very serious, but here again the prospect is distinctly encouraging. During the last three years not far short of a million and a half has been given for these purposes.

Voluntary gifts are still the rock upon which hospital expenditure is based, and it must necessarily always be so. These gifts last year provided 37 per cent. of the aggregate income, but they are now being run rather closely by patients' payments, which in 1924 reached 29 per cent. of the receipts. This is a figure that is ever growing all over the country, and the more it grows the stronger the voluntary position will become. It is hopeless to expect that great hospitals can "live on their means," and last year their investment income was only one-fifth of the total. Ten years hence the demand upon the resources of the hospitals will be even heavier than at present. It is therefore important to consider the possibilities of reducing expenditure in directions that will not impair their usefulness, and Sir Mackenzie Chalmers has just renewed the suggestion to which we gave support a few months ago, that they should be relieved of a proportion of the heavy burden of local rates. It is understood that the London hospitals pay close upon £40,000 a year in rates, and there is a strong claim for their all-round reduction by, say, one-half—since they clearly derive benefit from local expenditure the case for total exemption would not be strong. Then there is the old story of the death duties on bequests to hospitals—duties which not only rob the hospitals but discourage testators, since both the institution and the dead man's estate suffer. Lord Cave's Committee some four years ago recommended that bequests to hospitals should be exempt from the 10 per cent. legacy duty on the ground that "there appears to be no good reason why the State should intercept at the source one-tenth of all sums bequeathed for the benefit of the sick." Since then more than one Chancellor of the Exchequer has refused to honour a recommendation which, it is believed, would help the hospitals to the extent of about £100,000 a year without raising any of the thorny questions implicit in more direct forms of State aid.

THE INTERNATIONAL CONGRESS ON CHILD WELFARE.

THE first International Congress on Child Welfare has been held during the past week in Geneva, and the various factors in the well-being of the young have been taken into consideration from international aspects. With regard to the diminishing of infant mortality, some of these may well be beyond human power; for example, Dr. Afifi, speaking as an official delegate of the Egyptian Government, stated that the excessive heat of the summer in Egypt was responsible to a large extent for the increased mortality of infants during the months of June, July, and August. The infant mortality in Egypt is certainly very high, for the last figure which we have seen was 143 per 1000 births; but before the sacrifice of life thus implied can be attributed to the climate it is necessary that we should have analogous figures for comparison collected from other countries having as wide a range of temperature as prevails in Egypt. The season of the year when the deaths occur is another point which might well have been brought before the Congress, and no doubt in future meetings subjects like this, of wide international relevance, will be set down for discussion. According to Dr. Afifi it is noticeable that in Egypt the infant death-rate per 1000 has gone up steadily for some years, almost in proportion to the increase of the population, which is simply a proof of his own statement that it is the conditions prevalent in the cities which are responsible for the sacrifice of child life.

Annotations.

"Ne quid nimis."

ROYAL COLLEGE OF SURGEONS IN IRELAND.

A RESOLUTION was unanimously adopted at a special meeting of the Council of the Royal College of Surgeons in Ireland, expressing high appreciation of the conduct of Mr. R. C. B. Maunsell, the President, in the recent controversy, and confidence of his defence of the interests of the College. The Council then considered the whole situation, which has arisen under the decision to institute a separate medical register for the Irish Free State, taking note of many suggestions from various sources that they should intervene in the political issues. The Council, however, decided, seeing that the medical profession in Ireland have never interfered in any way in politics, to fight the matter by educating public opinion, and only thus influencing politicians. As a beginning of the education of the public they have decided to convene a meeting of medical practitioners on Sept. 8th in the Examination Hall of the College.

OCCUPATIONAL DISEASES OF SEAMEN.

Dr. H. Ruge, Marinestabsarzt (Surgeon Lieut.-Commander) in the German Navy, in some interesting articles published in the *Marine Rundschau*, observes that when diseases of seamen came prominently into notice in the age of the great voyages of discovery the first and worst was scurvy. Next in importance were the infective diseases: Typhus (ship-fever), typhoid, dysentery, and in the tropics yellow fever and malaria. The number of sick was almost incredible in these early expeditions. In 1757 a French expedition, as it sailed, sent 400 typhus cases ashore at Brest from two of its ships. A thousand were landed at Louisburg on arrival, survivors were re-embarked in autumn, and when the ships reached Brest there were 4000 sick in the fleet, while hundreds had died during the passage. Hosier in 1726, off Colon, lost his personnel twice over from yellow fever. Little was known definitely about prevention, but Cook (1772–5) and La Perouse (1785–8) had hardly a man sick in their voyages. The food was unbelievably bad; the water was no better. It was not till 1815 that iron tanks began to replace the old decaying wooden casks. To make the dirty, stinking water tolerable it was mixed with rum, of which each man was issued with 5 oz. daily. Thereon alcoholism began to rage. Rouppe (1764) calls delirium tremens the characteristic disease of seamen, but improvement set in in the latter half of last century, and the disease is now rare.

Dr. Ruge classifies the sickness of the modern German Navy in four main groups: Chills, mechanical injuries, inflammations of connective tissue, and venereal disease. Under "chills" are included tonsillitis, sore-throat, bronchial catarrh, pleurisy, acute catarrhal, gastric and intestinal attacks, and rheumatism of muscles or joints. Chills are more common afloat than ashore (as 75 to 65), more frequent in iron than in wooden ships (as 3 to 2 in 1893–7), and it is the engine-room, or rather the stokehold, staff that suffer most, and he comments that these men should always wear jerseys when on deck in cold weather; steam heating of the ship also lessens risk. Mechanical injuries cause much loss of time. They are more frequent and more dangerous in sailing ships, but these ships are becoming few. The mortality of accidents in sailing ships is 30 per cent., in steamships 5 per cent. But most accidents nowadays occur about the guns, and sailors are the victims; there are few accidents in the engine-room. Recruits and men new to the ship suffer most, and accidents are more frequent on Mondays, lessening as the week goes on. This is due to unwisely-spent leave at week-ends, when, too, venereal disease is most often acquired. Eighty-five per cent. of accidents

occur on duty. Many might be prevented by improved construction of ships, but accidents there will always be where people are working hard. Men in ships are fortunate in having a doctor at hand when they are injured, so that wounds need not become septic. Boils cause much loss of service; they are generally on the arms, and attack sailors more than stokers. They are at their maximum in summer but have a second maximum in autumn, when the recruits join. The recruits are very susceptible, probably because they are constipated. Cleanliness is the best protection against boils, and once they have a hold on the ship, the ship should be disinfected. Three-quarters of the venereal infections are contracted by men under the influence of alcohol. At Hamburg, Nocht found 7000 cases of venereal disease in three years aboard ships entering the port. The East Asiatic Squadron has had one-third of its force at one time under treatment. Sailors suffer much from syphilis, and the worst infected women are at the ports. Unlike alcoholism, venereal disease has decreased little since the war. The men in the German Navy are warned, preventives are always available for them: the merchant seaman is less protected. Dr. Ruge's article deals interestingly with a subject too little discussed.

PYELITIS IN INFANTS.

CASES of pyrexia occurring in infants of a few days or a few weeks old are frequently difficult to diagnose and troublesome to treat. They may, and usually do, have most symptoms referable to the alimentary tract such as anorexia, loss of weight, and vomiting. The fever or other manifestations of general constitutional disturbance may persist in an exasperating way for weeks and finally clear up without any diagnosis having been made, or any treatment, except "symptomatic," having been suggested. Some light has been shed on the possible cause of many of these cases in a discussion led by Dr. L. W. Sauer, of Evanston, Illinois, before the recent American Medical Association Session at Atlantic City.[1] He quotes 12 cases of his own, and three of Helmholz, in which the infants, varying from 6 to 28 days old at the probable onset of the disease, suffered from pyelitis; and he arrives at the following conclusions: (1) Neonatal pyelitis is probably a periodic disease occurring more frequently in male infants. (2) Gastro-intestinal symptoms, especially vomiting, anorexia, diarrhœa, and tympanites predominate. (Other of the more common clinical features noted are pyrexia, loss of weight, pallor, and constipation.) (3) The urine is invariably strongly acid and contains pus, *B. coli*, and a variable amount of albumin. Under the low-power lens numerous polymorphonuclear leucocytes, epithelial cells, erythrocytes, and perhaps casts are seen even in uncentrifugalised urine when fresh. (4) The disease, when free from complications, usually responds within six weeks to diuresis and continued alkalinisation of the urine. (5) The infection is probably by way of the blood-stream, the organism being pathogenic enteral *B. coli*. Diagnosis is not easy in the early stages, for various reasons, and it may be difficult in private practice to obtain a sample of the urine. Also it is known that while the pyrexia lasts there may be only one or two pus cells in the urine—scarcely sufficient to establish a diagnosis—and only when the temperature is nearing normal may there be an outpouring of sufficient pus to make the condition easily recognisable by microscopic examination. This raises the question as to whether the condition may be primarily and not secondarily a colon infection, especially as the symptoms are referable to the alimentary tract before pyuria is present. Alkalies are recommended in the treatment of such cases, though doubt has been cast on whether they are valuable in themselves or only in so far as they promote diuresis. Certainly the abundant use of plain water is advisable. Other measures suggested are careful regulation of the milk or other food, the administration of hexamine, and, in cases of extreme anorexia and vomiting, occasional stomach lavage, subcutaneous salines, and rectal feeding. It is possibly advisable to continue the administration of alkalies for several weeks after the urine is free from pus, albumin, and bacilli. In cases of troublesome diarrhœa the treatment of acute enteritis should be followed—e.g., castor oil, starvation for 24 hours, sips of sterile water, and a few minims of brandy alone being given; then albumin water, chicken tea, and so forth, until it is considered safe to begin with very dilute milk or other food of low carbohydrate content. The prognosis is good. Thirteen of the 15 cases quoted by Dr. Sauer recovered. Of the two exceptions, one was complicated by meningitis, and the other by congenital stenosis of the right ureter, with multiple abscesses of both kidneys, and *B. coli* septicæmia. Finkelstein, in 1924, reported that he had frequently diagnosed pyelitis within the first two weeks of life. Apart from his work and that of Helmholz there is little literature on the subject, but the condition is probably much more common, in milder degrees at any rate, than is generally supposed. Certainly it is possible that many cases of pyrexia in infants, which clear up in a most gratifying way when a mixture containing a little sodium bicarbonate and flavouring matter is administered, may be due to pyelitis.

[1] Jour. Amer. Med. Assoc., August 1st, 1925, p. 327.

QUINIDINE IN MALARIA.

A RECENT publication of the United States Public Health Service[1] shows that the death-rate from malaria from 1919–23 still ranges as high as 40 and 50 per hundred thousand in some of the Southern States, although there is encouraging evidence that the disease is gradually disappearing and constantly becoming confined within narrower geographic limits. Some years ago a committee was appointed by the Medical Research Council to inquire into the value of quinine derivatives. The reputed toxicity of cinchonine and the previous reports of Major H. W. Acton, I.M.S., on the value of quinidine decided the committee to confine its inquiry to the properties of the latter alkaloid. Naturally, the conduct of this investigation was beset with many difficulties. Since the committee had no long series of malarial patients in a malaria-free country on which to experiment, the test took the form of a comparison of the relative efficacy of quinine and quinidine in causing disappearance of the parasites from the blood during an acute attack, and were carried out by medical officers in various centres.[2] Reports have been received from Palestine, Khartoum, British Guiana, Uganda, and the Federated Malay States, and all suggest that quinidine is at least as efficacious as quinine, but do not support Major Acton's original suggestion that quinine is definitely inferior to quinidine in the benign tertian infection, though specific for the malignant subtertian parasite. The contribution thus made is a small one, but should lead on to further and extensive observations. It deposes quinine from the position of unique value which practice and tradition have accorded to it among the cinchona alkaloids. The depressant effect of quinidine on the heart may constitute a real drawback to its employment, but the committee have reason to think that the reputed toxicity of cinchonine is due to impure specimens, and a small supply of carefully purified cinchonine has been sent out for trial at Kuala Lumpur. A systematic comparison of these alkaloids, particularly cinchonine and cinchonidine, is very much to be desired. If the suggestions made in this preliminary report are confirmed, it will form a most valuable contribution to medical science, for if an indefinite mixture of the alkaloids could replace quinine the problem of cheapening the supply of antimalarial remedies would be much simplified. Interest in the experiments is not confined to malaria-

[1] Reprint No. 926, Public Health Reports. Government Printing Office, Washington, U.S.A. 5 cents.
[2] Medical Research Council, Special Report Series No. 96. H.M. Stationery Office. 1s.

infested countries, since the efficient control of benign tertian malaria is of great importance to British psychiatrists in connexion with the treatment of general paralysis by the Wagner-Jauregg method.[1]

INOCULATION AGAINST MEASLES.

Dr. Arturo Atria, of Santiago de Chile, has writen a book[2] advocating the universal adoption of the practice of inoculation against measles. As physician-in-chief of the Section of Bacteriology at Santiago and a late student of the Pasteur Institute he speaks with a certain authority, and he invokes the support of tradition by giving considerable space to enthusiastic eulogy of Home, a Scottish physician of the eighteenth century, who first experimented with inoculation about 1740 on a small scale. Home was certainly an able man, much in advance of his age, but the number of his cases was far too small to admit of any deduction being made from the results, and his work is only of historical interest. Nor does the amount of work done since on the same lines come anywhere near to justifying the sweeping conclusions arrived at by Dr. Atria. His attitude may be judged of from the fact that he speaks of 1150 cases as being a colossal number, whereas to arrive at any definite judgment we should need thousands of cases, carefully observed during a period of years. No evidence is offered as to how long the effects of inoculation last in conferring immunity, nor does the author seem to weigh the very varying degrees of liability in communities and individuals in considering such statistics as he has got. Dr. Atria advocates wholesale case-to-case inoculation with the blood of individuals at a certain stage in the disease, but he does not face adequately the difficulties and dangers of the course that he proposes. Two obvious ones may be mentioned: (1) As the virus cannot be stored, large numbers of cases would be required from which to inoculate, and there would be a constant risk of imparting some other disease, such as syphilis or tubercle. (2) As the constitutional reaction in effective cases is presumably more severe than in ordinary vaccination, very large provision would have to be made for nursing and medical attention if the results are not to be disastrous. It is a pity that so much time and energy have been expended in advocating what in the present state of our knowledge can only be characterised as wholly premature. The bibliography, which has neither chronological nor alphabetical order, shows that a very large number of works has been consulted, but all that is of value in the book might well be compressed into one-tenth of the space occupied.

BRITISH HYDROLOGY.

INCREASED attention is being paid to the organisation of British spas, which, although differing in ranges of altitude and temperature from those abroad, do offer in a large number of cases amenities which not only compare favourably with many continental spas in the matter of treatment and comfort, but also save the expense and inconvenience which foreign travel may mean to many patients. During the war, when continental spas were no longer available to British visitors, and when the indicated treatment for many war victims was that provided by baths, the British waters had perforce to be resorted to, with the result that a somewhat neglected branch of medical science and practice in this country received a great impetus. During the past three years a course of lectures on medical hydrology has been given at the London University, arranged by the board to promote the extension of university teaching, and in coöperation with the Committee for the Study of Medical Hydrology in Great Britain. The fee for the course is £1, and in the week during which the course is held, usually at the end of April and the beginning of May, visits are made to, and demonstrations given at, some of the hydropathic centres of the country. Taken in connexion with the work of the British Spa Federation, which includes some of the leading spas complying with a certain standard of efficiency, the lectures are a step towards the organisation of British spas on lines laid down by Dr. Fortescue Fox in THE LANCET last year.[1] These were: (1) the coördination and development of British waters, under medical authority; (2) post-graduate lectures in hydrology at the universities; (3) facilities at one university for the systematic training of hydrologist practitioners. Particulars of the lectures and demonstrations can be obtained from Miss Hilda Fox, care of University Extension Department, University of London, South Kensington, S.W.7.

[1] THE LANCET, August 22nd, 1925.

[2] Profilaxis del Sarampion. By Arturo Atria. La Illustration Press. 1925. Pp. 351.

THE DOCTOR OF THE FUTURE.

UNDER this title Dr. George E. Vincent, the President of the Rockefeller Foundation, discusses the trend of medical practice in the United States. At present the mass of the population, "perhaps 75 to 80 per cent., are treated by general practitioners who have limited technical appliances, little or no specialisation of skill, and slight relation to medical services organised in hospitals, dispensaries, and clinics." Among the forces now at work which will modify the present state of things is the growth of preventive medicine which, by reducing sickness, will limit the material for curative practice. The high cost of sickness is leading to a demand for insurance. The character of a modern medical education is depleting the rural areas of their physicians. Already four types of doctors have emerged from the modern crucible according to Dr. Vincent, who classifies them as follows: "(1) the professorial doctor who teaches and investigates; (2) the specialist; (3) the socialised or full-time salaried doctor; and (4) the individual, independent, general practitioner." Can the latter type, still the most important numerically, continue to survive? he asks, with his increasingly difficult handicaps. While his disappearance would be a serious loss, Dr. Vincent evidently does not look on it as an impossibility. As conditions of survival he postulates coöperation in the use of laboratories and other resources, willingness to take part in insurance schemes, and above all readiness to become a practitioner of preventive medicine.

THE DIPLOMA IN TROPICAL MEDICINE.

IN the Students' Number of THE LANCET under this heading it is stated that systematic instruction for these diplomas is given at the London School of Tropical Medicine, at 5, Endsleigh-gardens, London, N.W. The old London School of Tropical Medicine now forms the Tropical Division of the London School of Hygiene and Tropical Medicine, and the address is 23, Endsleigh-gardens, Euston-road, N.W. 1, and not 5. An account of the activities of the new body was given in THE LANCET of June 27th, 1925 (p. 1354).

Sir StClair Thomson has been appointed hon. consulting laryngologist to the Italian Hospital, London.

Dr. T. Vincent Dickinson has been elected Master of the Society of Apothecaries, one of the oldest of the City Livery Guilds.

[1] Vide THE LANCET, 1924, ii., 884, 885.

EXTENSION OF KIDDERMINSTER HOSPITAL.—In commemoration of his silver wedding the Prime Minister has given £5000 towards the £25,000 required for alterations and additions to Kidderminster District General Hospital, and Mrs. Baldwin recently laid the foundation-stone of the extensions. The scheme embraces an out-patients' department with consulting room, a dispensary, an operating room, a new ward for 40 children, and a laundry.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

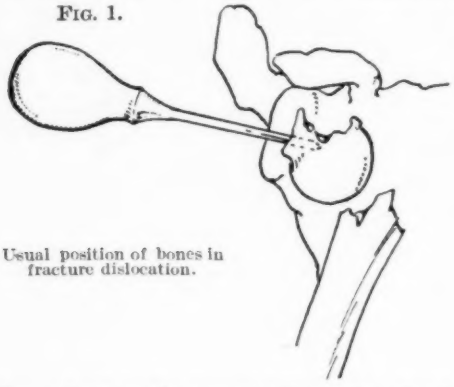
CXXXVII.—FRACTURE DISLOCATIONS OF THE UPPER END OF THE HUMERUS.

THIS complicated injury is fortunately a rare one. It is caused by direct violence upon the shoulder; the same blow which forces the head of the humerus out of the glenoid cavity breaks the neck of the bone. From this it follows that the fracture is often comminuted and that the head is usually rotated so that its axis in no way corresponds with that of the shaft. In this, as in the majority of juxta-articular fractures, a good result can only be obtained by early and exact diagnosis. The severity of the injury will cause so much pain, swelling, and distortion of the shoulder that there ought to be no excuse for neglecting thorough examination.

Dangers of Diagnostic Error.

There are two very real dangers of serious error. One is that of simply putting up the arm with sling and bandage without making an exact diagnosis. In the first place this is done by way of "first-aid" and then, the patient being fairly comfortable, a policy of procrastination is followed for days and then

FIG. 1.



Usual position of bones in fracture dislocation.

weeks, and when the true nature of the disaster is brought to light by the fixed and painful shoulder on which the X rays are turned for the first time, the chance of cure has passed by and a judge and jury are invited to the consultation.

The other likely mistake is to recognise the dislocation, by the emptiness of the glenoid cavity and the sagging inwards of the deltoid beneath the acromion, but to overlook the fracture. If then an attempt to treat the dislocation is made, a spurious reduction may be effected by forcing the shaft of the bone into the shoulder-joint and there leaving it. This mistake should be avoided by noticing that the head of the bone does not rotate with the shaft, and that crepitus is often elicited. Of course, the use of the X rays within the first 24 or 48 hours of the accident should be regarded as absolutely essential, and the fact that this rule is so often neglected, with disastrous results, affords a most puzzling comment on the mentality of doctors, who thus carelessly endanger the patient, themselves, and the reputation of the profession.

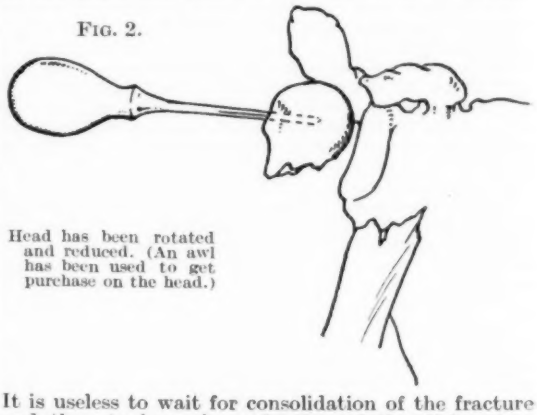
The X ray picture ought to afford a clear indication as to the nature of the injury. The glenoid cavity is empty, the neck of the bone is broken, and the upper fragment is distorted so that its fractured surface is turned away from that of the shaft. (Fig. 1.)

Open Operation and Reduction.

When these facts have been made clear, immediate arrangements should be made for open operation and reduction in a suitable institution. There is no alternative to operative treatment which can afford any hope of a good functional arm, and there is nothing gained by delay or the adoption of any temporising measures.

It is impossible to reduce the dislocation by any manipulation of the arm, because the continuity of the head and shaft of the humerus is broken.

FIG. 2.

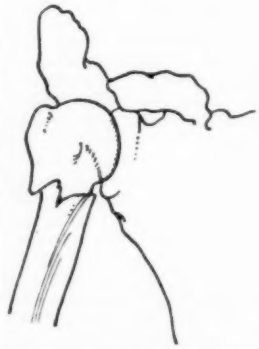


Head has been rotated and reduced. (An awl has been used to get purchase on the head.)

It is useless to wait for consolidation of the fracture and then to hope for reduction of the dislocation, because the alignment of the fragments is so faulty that only gross malunion can occur, and when it has occurred the torn capsule will be so united by scar-tissue as to make reduction impossible.

The operation for this injury involves the consideration of three main points—viz., adequate exposure, reduction of the head, and fixation of the fracture. Exposure should be by the ordinary anterior incision along the anterior border of the deltoid muscle. The cephalic vein is exposed and ligatured. Having made a three-inch incision and investigated the underlying conditions, it will probably be of advantage to prolong the incision upwards along the deltoid border to the clavicle, and then to cut outwards towards the acromion. The clavicular origin of the deltoid is cut and the muscle turned outwards. The capsule of the joint may be so much torn that no further division is necessary in order to get at the head of the bone. Otherwise the capsule should be divided by a vertical incision along the line of the long head of the biceps. The humeral head now being exposed, the difficulty consists in

FIG. 3.



Fracture treated by simple impaction.

FIG. 4.

Fragments shaped for impaction.

putting it back into the glenoid cavity and in rotating it into correct alignment. Probably the tendon of the subscapularis will already be torn, but it ought not to be necessary to cut any of the short rotators unless the operation is being done several weeks after the accident. Manipulations of the head of the bone may be effected by means of a shoe-horn elevator

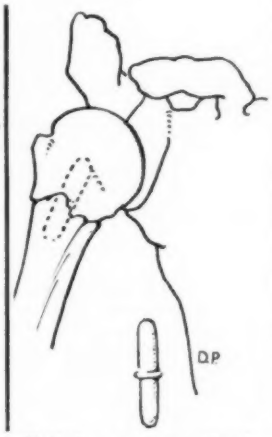
or by transfixing it with a stout bone-drill on a handle. (Fig. 2.)

When the head has been restored to its socket with its broken surface directed towards the axis of the arm, fixation of the fracture can be effected. In most cases this fixation does not require any special apparatus. The fracture is recent and the ends of the bone are jagged. All that is necessary is by traction and leverage to fit the ends together (Fig. 3), when the tension of the muscles may be trusted to keep them in apposition. If the bone ends are oblique or have become so smooth that they will not lock, then some impaction may be necessary. Often the shaft will present an outstanding point which may be trimmed up and forced into a cavity gouged out of the head. (Fig. 4.) Or else an intra-medullary peg, two inches long and a quarter of an inch thick, with a central stop may be used. This is first hammered tightly into the shaft and the projecting end is manœuvred into a hole drilled in the axis of the head. (Figs. 5 and 6.) Whatever method of fixation is used, great care should be taken to secure correct orientation of the fragments in regard to rotation. The operation is concluded by suturing of the capsule, the clavicular origin of the deltoid and the skin. The arm is put up in moderate abduction for the

FIG. 5.

Union by pegging. Peg inserted into distal fragment.

FIG. 6.



United over a peg. Inset shows the peg with central stop.

first few days with an axillary pad and a sling. Then, when the patient can sit up the arm is put on to an abduction splint, which is retained for four to six weeks. After the first ten days the splint is removed daily for exercise and massage.

If the patient's condition contra-indicates a general anæsthetic, the operation may be performed under local anæsthesia, by infiltrating the brachial plexus with 2 per cent. solution of novocaine. If the patient refuses an open operation, then the arm should be put up in full abduction from the outset.

Late Operation.

If the nature of the case has been overlooked, and treatment has to be undertaken six weeks or more after the accident, then an attempt may be made to carry out the reconstructive operation above described, but it will seldom be found possible because the head of the bone has become so fixed and also so atrophied. Under these circumstances the head must be removed, whilst the shaft, which may be rounded off, is placed in the glenoid cavity. But at the best this operation will only secure a weak joint for which a subsequent arthrodesis may have to be done.

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Surgeon to the Bristol General Hospital; Professor of Surgery, University of Bristol.

STUDENTS' GUIDE—SESSION 1925–26.

DENTAL SURGERY.

APPEARANCE on the Medical Register entitles a practitioner to practise as a dentist, although he cannot register as such without degree or licence in dentistry; but few dental appointments at general or special hospitals or dispensaries are available save to those with a special diploma.

In THE LANCET of August 29th we outlined the constitution of the Dental Board of the United Kingdom, and the regulations in regard to the registration of dental students.

The Examining Bodies in Dentistry which grant degrees or diplomas in the subject are as follows:—

Royal College of Surgeons of England.—Licence in Dental Surgery.

Royal College of Surgeons, Edinburgh.—Licence in Dental Surgery. The College also grants a Higher Dental Diploma which is registrable in the Dentists Register as an additional qualification.

Royal Faculty of Physicians and Surgeons of Glasgow.—Licence in Dental Surgery. The curriculum, which is similar to that of Edinburgh, includes in addition dental bacteriology.

Royal College of Surgeons in Ireland.—Licence in Dental Surgery.

University of Birmingham.—Dental licence; degrees of Bachelor and Master of Dental Surgery (B.D.S. and M.D.S.).

University of Bristol.—Licence in Dental Surgery; degrees of Bachelor and Master of Dental Surgery (B.D.S. and M.D.S.).

University of Durham.—Licence in Dental Surgery; degrees of Bachelor of Dental Surgery (B.D.S.) and of Master of Dental Surgery (M.D.S.).

University of Leeds.—Licence in Dental Surgery; degrees of Bachelor of Dental Surgery (B.Ch.D.) and Master of Dental Surgery (M.Ch.D.).

University of Liverpool.—Licence in Dental Surgery; (L.D.S.); degrees in Dental Surgery (B.D.S. and M.D.S.).

University of London.—Degree of Bachelor in Dental Surgery.

University of Manchester.—Degrees of B.D.S.; and a licence in Dentistry.

University of Sheffield.—Degree of Bachelor of Dental Surgery; and the diploma of Licentiate in Dental Surgery.

Queen's University of Belfast.—Licentiate in Dental Surgery, Bachelor of Dental Surgery, and Master of Dental Surgery.

In the following syllabus the respective requirements of the various examining bodies in dentistry are set forth, together with the facilities for dental study offered by certain other institutions.

THE EXAMINING BODIES IN DENTISTRY.

THE ROYAL COLLEGE OF SURGEONS OF ENGLAND grants a diploma in Dental Surgery under the following regulations, which apply to all candidates who have passed the required Preliminary Examination in General Education before Jan. 1st, 1923.

Candidates are required to pass three examinations: the Preliminary Science Examination, the First Professional Examination, and the Second Professional Examination. 1. Preliminary Science Examination.—This is identical with Part I. of the First Examination of the Examining Board in England. Candidates must pass the Preliminary Science Examination before commencing the courses required for the Second Professional Examination. 2. The First Professional Examination.—The candidate must produce evidence of instruction in Dental Metallurgy and Practical Dental Mechanics. The Examination consists of Part I. (Mechanical Dentistry), Part II. (Dental Metallurgy and the Properties of Dental Materials), the examination in Dental Metallurgy being by written paper, and Part III. (*a*) General

Anatomy and Physiology, (*b*) Dental Anatomy and Physiology conducted by papers and vivâ voce examination. The parts may be taken together or separately. 3. The Second Professional Examination.—This is divided into two parts: (*a*) the General, (*b*) the Dental. The General part must be passed before the Dental portion. The instruction is obtained partly at a General Hospital and partly at a Dental Hospital. The Second Professional Examination consists of: Part I., General Surgery and Pathology; Part II., Dental Surgery and Pathology, and Practical Dental Surgery. There is a written and vivâ voce examination in each part and a practical examination as well in Part II. Exemption from the Preliminary Science Examination is granted to candidates who have passed an Examination in Chemistry and Physics for a degree in Medicine at a University in the United Kingdom, in India, or in a British colony. Exemption from Examination in Anatomy and Physiology is granted to candidates who have passed the Second Examination of the Examining Board in England or the corresponding Examination for any degree or qualification in Medicine or Surgery registrable under the Medical Act of 1886. Exemption from Examination in General Surgery and Pathology is granted to candidates who have passed the Examination in Surgery of the Examining Board in England or the corresponding Examinations of the Universities above mentioned. The fee for the diploma is 20 guineas, and is payable as follows: Preliminary Science Examination, for each admission to Part I., £3 3*s.*; Part II., £2 2*s.* First Professional Examination, for each admission to Part I., £4 4*s.*; Part II., £1 1*s.*; Part III. (*a*) £2 2*s.*; (*b*) £2 2*s.*; Second Professional Examination, for each admission to Part I., £2 2*s.*; Part II., £4 4*s.*

The following Regulations apply to all candidates who pass the Preliminary Examination in General Education on or after Jan. 1st, 1923.

1. Candidates for the Licence in Dental Surgery of the Royal College of Surgeons of England are required to pass one of the Examinations in General Education recognised by the Conjoint Examining Board in England, and the Pre-Medical Examination in Chemistry and Physics conducted by that Board or one of the examinations recognised in lieu thereof, before they commence the curriculum of professional study for the Licence extending over four years.

2. Candidates who produce evidence of having been registered by the General Medical Council as Medical or Dental Students on or after Jan. 1st, 1923, will be considered to have passed the required Preliminary Examination in General Education and the Pre-Medical Examination.

3. Candidates who hold the degree of D.M.D. Harvard, D.D.S. Pennsylvania, D.D.S. Michigan, D.D.S. Illinois, D.D.S. St. Louis, Missouri, D.D.S. Northwestern University, Chicago, D.D.S. Minnesota, D.D.S. Tufts College, Boston, B.D.S. Sydney, or the Licence of the Dental Board of Victoria, Australia, are not required to pass these Examinations.

First Professional Examination.—1. The First Professional Examination consists of Part I. Dental Mechanics, Part II. Dental Metallurgy and the Properties of Dental Materials and Part III. Section (*a*) General Anatomy and Physiology, Section (*b*) Dental Anatomy and Physiology, and is held in January or February, April, and September or October in each year.

2. Candidates may present themselves for the several Parts of the First Professional Examination together or separately, but before admission to any part of the Examination they must produce evidence of having passed the required Preliminary Examination in General Education and the required Pre-Medical Examination or a certificate of having been registered as a Medical or Dental Student by the General Medical Council.

Part I. *Dental Mechanics.*—3. This Examination is a practical one, conducted in the Mechanical Laboratory of one of the Dental Hospitals in London.

4. Candidates must give 21 days' notice in writing of their intention to present themselves for the Examination, and at the same time forward certificates:—

(1) Of having been engaged during a period of not less than two years in acquiring a practical familiarity with the details of Dental Mechanics. One year at least of this study must be taken in the Mechanical Department of a recognised Dental Hospital where the arrangements for teaching Dental Mechanics are satisfactory to the Board of Examiners in Dental Surgery. Part or the whole of the rest of the course may be taken as a pupil with a competent dentist provided that time spent as a private pupil shall be at least twice the time required for the corresponding instruction* taken at a Dental School.

(2) Of having attended at a recognised Dental Hospital and School: (*a*) A course of lectures on Dental Mechanics; (*b*) a course of Practical Dental Mechanics, including the manufacture and adjustment of 6 dentures and 6 crowns.

6. Any candidate referred at this Examination who does not hold a registrable Dental Qualification will be required, before admission to re-examination, to produce a certificate of having received three months further instruction under the conditions specified in Certificate (1) paragraph 4.

Part II. *Dental Metallurgy and the Properties of Dental Materials.*—7. This Examination is conducted by written paper.

8. Candidates must give 21 days' notice in writing of their intention to present themselves for the Examination, and at the same time forward a certificate:—Of having attended at a recognised Dental Hospital and School: (*a*) A course of lectures on Dental Metallurgy; (*b*) a course of Practical Dental Metallurgy.

9. Any candidate referred at this Examination who does not hold a registrable Dental Qualification will be required, before admission to re-examination, to produce a certificate of having worked in a Dental School, to the satisfaction of the Dean, for a further period of three months.

Part III. (*a*) *General Anatomy and Physiology*, (*b*) *Dental Anatomy and Physiology.*—10. This Examination is partly written and partly oral.

11. Candidates may enter for Section (*a*) only or for Sections (*a*) and (*b*) together on producing the required certificates, but they will not be allowed to proceed with Section (*b*) until they have passed in Section (*a*). In the case of a candidate who enters for both Sections and fails in Section (*a*) the fee paid for admission to Section (*b*) will not be forfeited, but will be credited to the candidate on readmission to examination in that Section. Candidates who enter for both Sections together may pass in Section (*a*) although failing to pass in Section (*b*).

12. Candidates must give 21 days' notice in writing of their intention to present themselves for the whole or for one Section of this examination and at the same time forward certificates:—

(1) For Part III. (*a*). Of having attended at a recognised Medical School: (*a*) Courses of instruction in Anatomy, including special demonstrations on prepared dissections during three terms; (*b*) a course of dissections to include, if possible, the head and neck, during one term; (*c*) courses of instruction in Physiology, including General Biology, Biochemistry, and Biophysics, during three terms; (*d*) a course of instruction in Histology.

(2) For Part III. (*b*). Of having attended at a recognised Dental School: (*a*) A course of instruction in Dental Anatomy and Physiology; (*b*) a separate course of instruction in Dental Histology, including the preparation of Microscopical Sections.

13. A candidate referred at this examination who does not hold a registrable Dental Qualification will be required, before readmission to Section (*a*), to produce a certificate of three months' additional study of Anatomy and Physiology at a recognised Medical School, and will be required before readmission to Section (*b*) to produce a certificate of having worked

* This instruction may be taken prior to the date of passing the Examination in General Education and the Pre-Medical Examination, but will not be counted as part of the required four years of professional study unless taken after passing the Pre-Medical Examination.

in a Dental School, to the satisfaction of the Dean, for a further period of three months.

14. *Exemptions.*—Candidates who have passed Section I. of the First Professional Examination of the Conjoint Examining Board in England, or who produce evidence of having passed the Examination in Anatomy and Physiology for a degree, or other qualification, in Medicine or Surgery, registrable under the Medical Act of 1886, or for the degree of M.B. or M.D. of a Foreign or Colonial University recognised by the Conjoint Examining Board in England, are not required to pass Section (*a*).

Second Professional Examination.—1. The Second Professional Examination is held in February, May or June, and November in each year, and consists of: Part I., General Surgery and Pathology; Part II., Dental Surgery and Pathology, and Practical Dental Surgery.

2. Candidates who have passed the First Professional Examination at least six months† previously may present themselves for Part I. only on producing the certificates mentioned in paragraph 6 of this section, or they may enter for the whole Examination at one time on producing the certificates mentioned in paragraphs 6 and 10 of this section.

3. Candidates must pass in Part I. before proceeding to Part II.

4. Candidates who enter for the whole Examination at one time may pass in Part I. although failing to pass in Part II.; but if they fail to pass in Part I. they will not be allowed to proceed with the Practical and Oral Examinations in Part II. In such cases the fee paid for admission to Part II. will not be forfeited, but will be held over until such time as the candidate is readmitted to examination in that Part.

Part I. *General Surgery and Pathology.*—5. This Examination is partly written and partly oral.

6. Candidates must give 21 days' notice in writing of their intention to present themselves for this Examination, and at the same time forward certificates:—

(1) Of having attended at a recognised Medical School: (*a*) A course of instruction‡ in Surgery during two terms; (*b*) a course of instruction in Medicine during two terms; (*c*) a course of instruction in General Pathology (including Bacteriology) during two terms. (2) Of having acted as Surgical Dresser in the Out-patient Department of a recognised Hospital for three months. (3) Of having attended, at a recognised Hospital or Hospitals, the practice of Medicine and Surgery, including clinical lectures, for 12 months. (4) Of being 21 years of age.

7. Any candidate referred at this Examination who does not hold a registrable Dental Qualification will be required, before admission to re-examination, to produce a certificate of such additional study during three months at a recognised Medical School and Hospital as the Teachers of the School may determine.

Exemptions.—8. Candidates who are Members of the College or who have passed the Examination in Surgery of the Conjoint Examining Board in England, or who produce evidence of having passed the Examination in Surgery for a Degree, or other Qualification in Medicine or Surgery registrable under the Medical Act of 1886, are not required to pass Part I. of the Second Professional Examination.

Part II. *Dental Surgery and Pathology.*—9. This Examination is partly written, partly oral, and partly practical. The oral examination is conducted by the use of preparations, casts, drawings, &c. At the practical examination candidates may be examined:—

(*a*) On the treatment of Dental Caries, on the preparation and treatment of teeth by filling with gold or other material, by inlaying or by crowning, and on other operations in Dental Surgery. (Candidates must provide their own instruments.) (*b*) On the treatment of abnormalities of position of the teeth of children. (*c*) On Clinical cases.

† The interval of six months is not required in the case of a colonial or foreign dentist.

‡ These courses of instruction must be attended after the completion of the courses in Anatomy and Physiology.

10. Candidates must give 21 days' notice in writing of their intention to present themselves for this Examination, and at the same time forward certificates:—

(1) Of having been engaged during four years in the acquirement of professional knowledge subsequently to the date of registration as a Medical or Dental Student, or of having passed the Pre-Medical Examination conducted or recognised by the Conjoint Examining Board in England. (2) Of having attended at a recognised Dental Hospital and School: (*a*) A course of Dental Surgery and Pathology; (*b*) a separate course of Practical Dental Surgery; (*c*) a course of Dental Bacteriology; (*d*) a course of Dental Materia Medica; (*e*) a course of practical instruction in the administration of such Anæsthetics as are in common use in Dental Surgery. (3) Of having attended at a recognised Dental Hospital and School, or in the Dental Department of a recognised General Hospital, the practice of Dental Surgery during two years.

11. Any candidate referred at this Examination who does not hold a registrable Dental Qualification will be required before admission to re-examination to produce a certificate of three months' additional study at a recognised Dental Hospital.

Fees.—The fee for the Diploma in Dental Surgery is 20 guineas.

Synopses of examinations and all further information can be obtained from the Director of Examinations, Examination Hall, Queen-square, London, W.C. 1.

ROYAL COLLEGE OF SURGEONS, EDINBURGH.—Regulations giving a list of Preliminary Examinations recognised for obtaining the Licence in Dental Surgery, as well as of the subjects of the Professional Examinations, may be obtained from Mr. D. L. Eadie, Clerk to the Royal College of Surgeons, at 49, Lauriston-place, Edinburgh. Candidates must produce certificates of having, subsequently to the date of registration, been engaged for four years in professional studies and of three years' instruction in Mechanical Dentistry from a registered dental practitioner, except in the case of previously registered medical practitioners, when two years will be considered sufficient. Candidates must also have attended a course of instruction at a University or in an established school of medicine or in a provincial school specially recognised by the College as qualifying for the Diploma in Surgery. In addition they will be required to have attended in a recognised dental hospital, or with teachers recognised by the College, special courses of lectures and instruction in Anatomy and Physiology (Human and Comparative), Surgery, Pathology, Materia Medica, Dental Histology, and Practical Dental Mechanics and Metallurgy; two years' attendance at a dental hospital or the dental department of a general hospital recognised by the College. Practical instruction in Mechanical Dentistry from a registered Dentist, or in the Mechanical Department of a recognised Dental Hospital and School, for three years. Candidates who have passed the First and Second Examinations for the Triple Qualification will be exempt from the First Dental Examination, and will have the advantage of being admissible either to the Final Dental Examination or to the subsequent Examination for the Triple Qualification, or to both. But the First Dental Examination will not be held as equivalent to the First and Second Triple Examinations, and will admit to the Final Dental Examination only. Candidates who are Licentiates of this College or who may be registered medical practitioners will be required to produce certificates of attendance on the special subjects only and will be examined in these only for the dental diploma. First Professional Examination: The candidate must have attended the required courses. The examination embraces (1) Chemistry and Physics; and (2) Anatomy and Physiology. The fee is £5 5*s.* for the complete examination, and £3 3*s.* is payable for each division. In all cases of rejected candidates the fee for re-entry is £3 3*s.* Second Examination: The candidate must have attended the remaining courses of the curriculum, must produce certificates showing that he is 21 years of age, and must pay a fee of £10 10*s.*,

for re-entry £5 5*s*. The examination embraces (1) Surgery and Medicine; and (2) the special subjects of Dental Anatomy and Physiology, Dental Surgery and Pathology, Dental Materia Medica, Dental Mechanics and Dental Metallurgy, with a practical as well as the written and oral examinations in the subjects of Dental and Oral Surgery, Pathology, and Mechanics. The candidate will be tested in the Treatment of Dental Diseases, in Operative Dentistry, the Administration of Anæsthetics, Orthodontics, and in Prosthetic and Mechanical Dentistry. Candidates who claim exemption from the First Dental Examination on the ground of having passed the First and Second Triple Qualification Examinations or other recognised examinations will, before being admitted to the Second Dental Examination, be required to pay the total fee of £15 15*s*. payable for the dental diploma. Candidates applying for copies of Regulations should state date of registration as a dental student. Fees and schedules must be lodged with the Clerk not later than one week before the examination.

Separate Regulations are issued for candidates registered as Dental Students after Jan. 1st, 1923, for whom there is a much more extended course.

Higher Dental Diploma.—The College grants a Higher Dental Diploma which is registrable in the Dentists Register as an additional qualification. Every candidate for the Higher Dental Diploma shall produce evidence that he has been engaged in the study or practice of his profession as a Registered Dentist for at least one year subsequent to his having obtained the Licence in Dental Surgery of the College, or a Licence or Qualification in Dental Surgery specially recognised by the College. Particulars as to the examinations can be obtained from Mr. D. L. Eadie, Clerk to the Royal College of Surgeons, 49, Lauriston-place, Edinburgh. The fee payable by Licentiates of the College is £15 15*s*. For all other candidates £21. A fee of £10 10*s*. is retained for examination expenses in the case of referred candidates.

The examination embraces the following branches of Dental Science and practice: Dental Surgery, Anatomy, Pathology and Bacteriology, Prosthesis, Anæsthesia, and Dental Radiology. The examination will be clinical and practical as well as written and oral. Candidates will be expected to show a high degree of knowledge and skill.

ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—The regulations as to certificates, curriculum, number, and subjects of examinations, fees, &c., are in effect similar to those of the Royal College of Surgeons of Edinburgh, but embrace Dental Bacteriology. Candidates can enter for the First Examination in three divisions, the first embracing Physics and Chemistry, the second Dental Metallurgy and Dental Mechanics, and the third Anatomy and Physiology. The examination in Dental Mechanics is practical; and there is at the Final Examination an examination in Practical Dentistry conducted in a dental hospital. Copies of regulations, &c., to be obtained from Mr. Walter Hurst, Registrar, Faculty Hall, 242, St. Vincent-street, Glasgow. Candidates applying for Regulations should state date of registration as a dental student.

ROYAL COLLEGE OF SURGEONS IN IRELAND.—Candidates for the licence in Dental Surgery are required to pass three professional examinations, and to produce certificates of having, subsequently to registration as a Dental Student, passed the examination in Biology, and attended courses of instruction in the following subjects at a recognised school of medicine: (*a*) Human anatomy, with dissections and demonstrations, for three academic terms. (*b*) Physiology, theoretical and practical, including Dental Physiology lectures for two academic terms. (*c*) Histology, for one academic term. (*d*) Chemistry and Physics as applied to Dentistry. For the second examination certificates must be produced of having attended, at an institution recognised by the College for the purpose, the following courses: (*a*) General Pathology (including Bacteriology) for three academic terms. (*b*) Medicine for two academic terms. (*c*) Surgery for two academic terms. (*d*) The practice of a general hospital, with certified instruction in Clinical Medicine, Clinical Surgery, and Venereal Diseases, for three academic terms. For the final examination evidence must be produced of having been engaged during a period of two years in acquiring a practical familiarity with the details of Mechanical Dentistry under the direction of the Superintendent of the Mechanical Department of a recognised Dental Hospital where the arrangements for teaching Mechanical Dentistry are satisfactory to the Council of the College; of having attended, at a recognised institution, courses of instruction in (*a*) Dental Surgery and Pathology, Orthodontia, and the Materia Medica and Therapeutics applicable to Dental Surgery. Lectures. Two courses. (*b*) Dental Mechanics. Lectures. Two courses. (*c*) Anæsthetics. One course. (*d*) The practice of a Dental Hospital, or of the Dental Department of a General Hospital. Twenty-four calendar months. (*e*) Dental Metallurgy. (*f*) A course of Radiology; of having been engaged during four years in the acquirement of professional knowledge subsequently to the date of registration as a Dental Student; four years of professional study; and of being 21 years of age.

The subjects of the first examination are Anatomy, General, and Physiology and Histology. For the second examination (*a*) General Pathology (including Bacteriology), (*b*) Medicine and Surgery. For the Final Examination, General Surgery and Dental Pathology, with the Materia Medica and Therapeutics applicable to Dental Surgery, Dental Mechanics and Metallurgy, Anæsthetics, Orthodontia. Candidates must pass in all the subjects set at each examination which in the second and final parts will be partly vivâ voce and partly practical, and will include the examination of patients and the performance of dental operations. The total fee for the Diploma in Dental Surgery is 21 guineas.

UNIVERSITY OF BIRMINGHAM.—The teaching of Dentistry is undertaken by the University acting in association with the Birmingham Dental Hospital and the Birmingham Clinical Board. The instruction at the Dental Hospital is carried out under the direction of the University Dental Clinical Board, so that students may fully qualify themselves for the Dental Diploma (L.D.S.) of this and other universities and licensing bodies. There is a special and well-equipped Dental Museum: The "John Humphreys Odontological Museum." An Entrance Exhibition, value £37 10*s*., is awarded annually at the commencement of the winter session. The following are the regulations for Degrees in Dentistry:—

1. The degrees conferred by the University are those of Bachelor and Master of Dental Surgery (B.D.S. and M.D.S.). 2. All candidates for these degrees must pass the same Matriculation Examination as that required from candidates for Medical Degrees. 3. The degree of Bachelor of Dental Surgery is not conferred upon any candidate who has not obtained a Licence in Dental Surgery. The candidate is not eligible for the degree until a period of 12 months has elapsed from the passing of his examination for the Licence in Dental Surgery. Of this period at least six months must be spent in the dental department of a general hospital approved by the University. 4. *A.* In addition to the Licence in Dental Surgery the candidate must produce evidence that he has attended the courses required by medical students of the University in the following subjects and passed the Examinations held in the same for Medical and Surgical Degrees: (*a*) Elementary Biology and Organic Chemistry, (*b*) Anatomy and Practical Anatomy, and (*c*) Physiology and Practical Physiology. *B.* That he has passed the class examinations in: (*d*) One Special Course of Lectures on Medicine, (*e*) One Special Course of Lectures on Surgery, and (*f*) Pathology and Bacteriology. *C.* That he has attended courses and passed the class examinations in: (*g*) Dental Histology and Patho-Histology, (*h*) Comparative Dental

Anatomy, and (*k*) Dental Surgery and Prosthetic Dentistry. *D.* That he has received instruction in the Clinical Examination of living cases at the dental department of a general hospital for a period of not less than six months. 5. The Final Examination will deal with the subjects in Classes *C* and *D*. 6. On the expiration of 12 months from the date of passing the Examination for the Degree of Bachelor of Dental Surgery, the candidate will be eligible for that of Master of Dental Surgery. 7. For this degree candidates will be required to submit a thesis containing original work, and investigations in some subject connected with Dentistry, which theses shall be submitted to examiners to be nominated by the Dental Advisory Board.

UNIVERSITY OF BRISTOL.—Candidates for the degree of Bachelor of Dental Surgery must be not less than 21 years of age and shall have pursued the courses prescribed by University regulations during not less than four years after passing the first examination in the subjects of Chemistry and Physics, of which three shall have been passed in the University. All candidates for the degree of B.D.S. are required to satisfy the examiners in the several subjects of four examinations. The First Examination: The subjects are Chemistry, Physics, and Biology, and the curriculum extends over one year.* The Third Examination: The subjects are Dental Mechanics, Dental Metallurgy, and Dental Materia Medica, and the candidate shall produce evidence of having served for three years an approved pupilage in Dental Mechanics.† The Second Examination: The subjects are Anatomy, Physiology, and Histology, Dental Anatomy, and Dental Histology. The Final Examination: The subjects are Medicine and Surgery, Dental Surgery (including Prosthetics), Operative Dental Surgery, and Dental Bacteriology. Degree of Master of Dental Surgery: Candidates shall be Bachelors of the University, shall present a Dissertation on some subject of Dental Surgery to be approved by the Examiners, and pass an examination in Dental Surgery. Diploma in Dental Surgery: Candidates need not be undergraduates, but shall have passed an entrance examination satisfactory to the University before being admitted to any professional examination; the curriculum extends over four years from the date of passing a preliminary science examination in Chemistry and Physics. A three years' pupilage in Mechanical Dentistry is required† and four examinations must be passed, the subjects of which agree with those of the B.D.S. Medicine is not required for the Final Examination. Candidates who are already registered medical practitioners shall be further exempted from study and examination in Physics and Chemistry, Anatomy, Physiology and Histology, Medicine, and General Surgery.

UNIVERSITY OF DURHAM.—Every Dental student must, at the commencement of his studentship, be registered in the manner and under the conditions prescribed for Medical students.

Licence in Dental Surgery: The first examination consists of three parts, which may be passed separately. Part 1, Organic Chemistry. Part 2, Biology. Part 3, Theoretical Dental Mechanics, Dental Metallurgy (Theoretical and Practical). Second Examination: Anatomy, Physiology (including Biochemistry and Biophysics), Dental Anatomy and Dental Histology. Third Examination: Pathology and Bacteriology, Practical Dental Mechanics, Dental Materia Medica and Therapeutics. Final Examination: Medicine, Surgery, Dental Surgery and Pathology, Orthodontics, Operative Dental Surgery, and Dental Prosthetics, and Anæsthetics.

A candidate before presenting himself for examination is required to furnish certificates of instruction in the required subjects, attended after registration as a dental student at recognised Colleges or Schools.

Degree of Bachelor of Dental Surgery (*B.D.S.*).—(*a*) For students taking their complete course of instruction in the University. Such students must pass the same matriculation tests as medical students, and the same pre-registration examination in Inorganic Chemistry and Physics. After registration students must spend five years in the University, on attendance on such subjects as Senate, on the recommendation of the Board of the Faculty of Medicine, may from time to time determine. They must attend the practice of the Newcastle-upon-Tyne Dental Hospital for not less than two and a half years. Six months of this time must be devoted to the study of the higher branches of dental science. There are four examinations.

The subjects of the *first* examination are Biology, Organic Chemistry, and Dental Mechanics and Metallurgy.

The subjects of the *second* examination are Anatomy, Physiology, Dental Anatomy and Histology.

The subjects of the *third* examination are Pathology and Bacteriology, Dental Materia Medica and Therapeutics, and Practical Dental Mechanics.

The subjects of the *final* examination are Medicine, Surgery, Dental Surgery and Pathology, and Orthodontia and Operative Dental Surgery. In this subject knowledge of a much higher standard, and more advanced practical work, is required than for the Licence in Dental Surgery.

(*b*) For candidates possessing a Licence in Dental Surgery of a British University. Candidates must study for at least one year in the University. During such year they must (*a*) attend a course of instruction in Pathology and Bacteriology, and (*b*) spend at least six months in the Newcastle-upon-Tyne Dental Hospital in the study and practice of the higher branches of dental science. They must also pass the third and final examinations for the degree of Bachelor of Dental Surgery.

Degree of Master of Dental Surgery (*M.D.S.*)—Every candidate for this degree must be a Bachelor of Dental Surgery of the University of not less than two years' standing, and present an essay embodying original work and research in some subject connected with dentistry. They must also perform to the satisfaction of the examiners a piece of special dental work demanding a high degree of skill and experience.

The examinations are held concurrently with the medical examinations, and the fees payable by candidates are as follow:—For the Licence in Dental Surgery: First, Second, and Third Examinations, each £3 10*s.*; Final Examination, £5; for Licence, £3; total, £18 10*s.* For the Bachelor of Dental Surgery: First, Second, and Third Examinations, each £5; Final Examination, £8; for the degree, £6 16*s.*; total, £29 16*s.* For the Master in Dental Surgery: examination, £5; degree fee, £6 6*s.* The practical examinations in dentistry are conducted at the Newcastle Dental Hospital.

UNIVERSITY OF LEEDS.—The degrees in Dental Surgery are Bachelor of Dental Surgery (B.Ch.D.) and Master of Dental Surgery (M.Ch.D.). All candidates for the degree of Bachelor of Dental Surgery shall be required to have passed the Matriculation Examination, to have pursued thereafter approved courses of study for not less than five academic years, two of such years at least having been passed in the University subsequently to the date of passing Parts I. and II. of the First Examination, and to have completed such period of pupilage or hospital attendance, or both, as may be prescribed by the regulations of the University. No candidate will be admitted to the degree who has not attained the age of 21 years on the day of graduation. The Diploma in Dental Surgery (L.D.S.) is awarded to successful candidates after attendance on approved courses extending over not

* Candidates who have passed the Higher School Certificate approved by the Board of Education in these subjects will not be required to sit for the first examination for either the B.D.S. or the L.D.S., and will be regarded as having completed one year of study.

† This pupilage must be taken either in the University laboratories or those of some institution recognised for the purpose by the University.

less than four years. The curriculum for the Diploma now includes the study of Biology for the First Examination. The classes in the Department of Dentistry begin on Oct. 1st. The instruction in the Preliminary subjects of Chemistry, Physics, and Biology are given in the main buildings of the University. The classes in the other subjects and the systematic courses in Dental subjects are held in the School of Medicine of the University in Thoresby-place. The clinical instruction is given in the Dental Hospital at the Leeds General Infirmary. Applications for the prospectus should be made to the Academic Sub-Dean of the Faculty of Medicine.

UNIVERSITY OF LIVERPOOL.—The University grants a Licence in Dental Surgery (L.D.S.) and degrees in Dental Surgery (B.D.S. and M.D.S.). The management of the curriculum (lectures, practical and clinical) is in the hands of the University Board of Dental Studies. The courses of systematic instruction are given in the main University buildings, and those in Dental Mechanics, Operative Dental Surgery, &c., are given in the University School Extension (opened 1922), adjoining the Dental Hospital, the laboratory of which is in charge of a skilled dental mechanic under the supervision of the Director of Dental Education. The clinical instruction is given in the Dental Hospital. Students can take the whole curriculum, including Dental Mechanics, at the University School of Dental Surgery. The times of the lectures at the University are arranged to meet the convenience of students, thus allowing the maximum time for attendance upon Dental Hospital practice. Fees: The fees for the complete courses, including Pupilage and Hospital Practice, are as follows: Degree of B.D.S., £250; M.D.S. (by research, £32; by examination, £27); L.D.S. (Liverpool), £198. Further information may be had from the Director of Dental Education, Prof. W. H. Gilmour.

In order to be admitted to the Bachelor's Degree in Dental Surgery a student must normally, after registration as an Internal Student, have—(1) Attended prescribed courses of study for five years at one or more Schools of the University. (2) Passed the following examinations:—(*a*) First Examination: *Part A:* (i.) Chemistry, (ii.) Physics, (iii.) Biology (Zoology and Botany); *Part B:* (iv.) Dental Metallurgy. Candidates may take Parts A and B separately. (*b*) Second Examination: *Part A* (i.) Anatomy, (ii.) Dental Anatomy, Dental Physiology, and Dental Histology; *Part B:* (iii.) Physiology; *Part C:* (iv.) Dental Mechanics. Candidates may take Part A separately but must take Parts B and C together. Third Examination: *Part A:* (i.) Elementary Bacteriology, (ii.) Clinical Chemistry, (iii.) General Pathology; *Part B:* (iv.) Dental Materia Medica, (v.) Dental Mechanics and Dental Prosthetics. Candidates may take Parts A and B separately. Students who have received not less than two years' instruction in Dental Mechanics previous to Nov. 30th, 1922, with a Dentist registered under the provisions of the Dentists Act (1921) and who have passed a recognised examination in preliminary education may, on application, be registered as students for the Licence under certain conditions.

UNIVERSITY OF LONDON.—The curriculum for the degree of Bachelor of Dental Surgery covers five years from Matriculation. The Regulations for Internal and External Students may be obtained post-free on application to the Principal Officer, at the University.

UNIVERSITY OF MANCHESTER.—In the University of Manchester the Dental Department forms an integral part of the Faculty of Medicine. This contains a series of laboratories, lecture rooms, and museums which will bear comparison with those of any other school in the kingdom, and the fullest opportunities for study are offered to students preparing for any of the professional examinations. Instruction adapted to the requirements of students preparing for the B.D.S. Degree and the Dental Diplomas of the University, the Royal College of Surgeons of England, and of other licensing bodies is given throughout the session both at the University and at the Dental Hospital of Manchester adjoining the University. The required general hospital practice is taken at the Manchester Royal Infirmary. Women students are admitted to the classes in the Dental Department, and for them common rooms are provided. The composition fee for candidates for the University degree of Bachelor of Dental Surgery is 94½ guineas, payable in three equal yearly instalments. The composition fee for candidates for the University Diploma in Dentistry is 84½ guineas, payable in three equal yearly instalments. The composition fee for candidates for the L.D.S. of England is 94½ guineas, payable in three equal yearly instalments. Students who have already served their apprenticeship with a private practitioner, and who propose to complete the final portion of their attendance at the University and at an approved dental hospital, will be required to pay the composition fee in two equal instalments at the commencement of the first and second years of studentship. The composition fee does not include the hospital fees, the examination fees, nor the fee for the conferment of the degree or the diploma.

UNIVERSITY OF SHEFFIELD.—*Degree of Bachelor of Dental Surgery.*—A candidate must have attained the age of 22 years on the day of graduation and have pursued the courses of study required by the University regulations during a period of not less than five and a half years subsequent to matriculation and the passing of the further examination in Chemistry and Physics, three of such years at least having been passed in the University, one at least being subsequent to the passing of the First Examination.

First Examination: The subject of the examination is Biology. Candidates must have attended a course of instruction for one year after matriculation and the passing of the further examination in Chemistry and Physics. Second Examination: The subjects of the examination are Anatomy, Physiology, Dental Anatomy, Physiology and Histology; Dental Mechanics, Dental Metallurgy. Final Examination: The subjects of the examination are: Part I., Pathology and Bacteriology; Part II., Medicine and Surgery, Dental Surgery, including Materia Medica and Therapeutics. Candidates for Part II. must have completed five and a half years of professional study.

Degree of Master of Dental Surgery.—Candidates must have passed the examination for the degree of B.D.S. at least one year previously and before admission to the examination must have held for not less than six months a dental appointment in a hospital affording full opportunity for the study of Dental Surgery. Candidates shall not be required to but may present a thesis embodying observations in some subject approved by the Faculty and a candidate whose thesis is of exceptional merit may be exempted from any part of the examination.

Diploma of Licentiate in Dental Surgery.—A candidate must have attained the age of 21 years on the day upon which he is to receive the diploma, and have pursued the courses of study required by the University regulations during a period of not less than four years subsequently to passing the preliminary examination and the passing of the further examination in Chemistry and Physics. Two years must be passed in the University, one at least being subsequent to the passing of the First Examination.

First Examination: The subject of the examination is Biology. Candidates must have attended a course of instruction for one year. Second Examination: The subjects of the examination are Anatomy and Physiology, Dental Anatomy and Physiology, Dental Mechanics, Dental Metallurgy. Final Examination: The subjects of the examination are: Part I., Pathology and Bacteriology; Part II., Medicine and Surgery, Dental Surgery, including Materia Medica and Therapeutics. Candidates for Part II. must have completed the fourth year of professional study.

The Dental Composition Fee is £25 for each year of the course. In addition a fee of £50 is payable each year the student receives instruction in Mechanical Dentistry in the Dental Department.

QUEEN'S UNIVERSITY OF BELFAST.—The following degrees and diplomas are now conferred: Licentiate in Dental Surgery, Bachelor of Dental Surgery, and Master of Dental Surgery. Lecturers have been appointed in Dental Surgery, Dental Mechanics, Dental Metallurgy and Materia Medica, and Orthodontia.

The TEACHING INSTITUTIONS will be summarised in the sequel.

(To be continued.)

Special Articles.

PROCEEDINGS OF THE ROYAL COMMISSION ON NATIONAL HEALTH INSURANCE.*

(Continued from p. 403.)

EVIDENCE OF NURSING AND OTHER WOMEN'S ORGANISATIONS.

Queen Victoria's Jubilee Institute for Nurses.

(App. LXXII. and Q. 19400–19582.)

THIS evidence was submitted by Miss Peterkin, Mrs. Bruce Richmond, and Major H. F. Cadell. The Institute was incorporated by Royal Charter in 1889 with the object of training and providing nurses for work among the sick poor in their own homes. The principal functions of the Institute are the organisation of local nursing associations, the selection, training, and supply of nurses, and the supervision of their work while in the service of the local associations. The conditions for affiliation of nursing associations are mainly (1) that the work should be carried out under the direction of the medical practitioners; (2) that it should be inspected periodically from the Institute by a nursing expert; (3) that it should be unsectarian; (4) that the nurses' services should be primarily for those unable to employ a private nurse, and that the necessitous poor should be nursed free.

The cost of domiciliary visits varies somewhat widely, but the average rate of payment works out at 1*s.* 4*d.* Arrangements which have been made with many approved societies have been of two kinds—

Those in the first group make payment at the rate of 1*s.* 4*d.* a visit for the first 30 visits and then at the rate of not more than 5*s.* a week; those in the second at the rate of 1*s.* a visit, the Nursing Association collecting from the patient, if it wishes to do so, the additional 4*d.* a visit which makes up the average cost. Payment for the nursing of chronic cases is not made by those in the second group; both make a payment of 5*s.* for a nurse's attendance at an operation.

The contention of the Council of this Institute was that there is in existence an organised national service capable of covering the whole country and it urged that nursing should be provided for all insured persons. It was thought that such a service could be provided at a capitation fee of 1*s.* per insured person.

Asked whether, if such a service were made available, there would be much point in having a nursing association and a local authority supervising it, the witnesses deprecated the employment of nurses by the local authority and urged that the work should be done through the existing associations; they desired to make no suggestions as to who should administer it on the insurance side. The reason why, up to the present, nursing had not been greatly in favour as an additional benefit was partly due to the system of payment by visit and partly due to the too-sure feeling that nursing arrangements were already freely available to insured and uninsured alike. The witnesses did not think that imposing a charge on National Health Insurance funds would injure the flow of voluntary subscriptions, but such a charge would entitle insured persons to priority of service.

In the Scottish part of this evidence it was stated that 80 per cent. of the homes of the people are quite suitable for the nursing care of all illnesses excepting only those requiring major surgical operations, and that while there are some rural areas still unnursed, the greatest need is for an expansion of the existing service in industrial centres, which it would not be difficult to arrange.

College of Nursing.

(App. LXXIII. and Q. 19583–19265.)

The College of Nursing has a membership of over 23,000 trained nurses, and is the largest organisation of trained nurses in the kingdom. Miss J. P. Watt, Miss G. Bremner, and Miss H. Viney gave evidence. The Council of the College recommend: (1) The provision of a statutory nursing benefit complemental to medical benefit from National Health Insurance funds; (2) that the staff employed for visiting care be fully qualified general-trained nurses with additional district training; and (3) that the visiting nursing care of the insured should be coördinated with other public nursing services, and that where resident care is required, the services of private nurses be utilised. They pointed out that the importance of trained domiciliary nursing has been much stimulated by the statement in 1914 of the then Prime Minister that any system of doctoring was hopelessly inefficient which was not supplemented by a good system of nursing. Notwithstanding this, nursing was still left very largely to voluntary enterprise. It was suggested that the Council's proposed scheme should be financed by a capitation payment of 1*s.* per insured person, with supplemental grants towards the cost of training and (experimentally) for the maintenance of a limited residential nursing service.

On the question of free choice of nurse the witnesses said that there was no analogy between the profession of nurse and panel doctor. Free choice of nurse is not feasible for economic reasons; also it was pointed out that a person going into a nursing home or a hospital cannot have choice of nurse. The witnesses thought that, amongst other things, a nursing service would bring home to the people the general benefit under the Act, because they would get a larger amount of individual attention.

(Q. 19596.) For example, you get a case of an abscess; it does not take the doctor very long to open it if you have a local anæsthetic; but it does take a nurse many days with dressings to get it healed. The same applies to pneumonia, where a doctor's visits would be about a quarter of an hour, whereas the nurse would spend nearly two hours, coming twice a day and perhaps a third time.

The witnesses estimated that 3 per cent. was the minimum number of insured persons requiring nursing and that this would increase as the value of the service became known.

(Q. 19595.) Would you agree that a nurse should be provided to attend upon an insured person only on the recommendation of the doctor in charge of the case?—It is an established practice now in district nursing that the people are at liberty to requisition the service, and after paying the first visit (unless it be a very trivial matter) the nurse arranges for or tells the people to call the doctor, and thereafter the doctor and nurse continue the treatment together.

It was thought that there was an adequate supply of trained nurses to meet the present needs of the insured population, and that the service would rapidly expand with improved conditions.

(Q. 19598.) The College wants an inclusive minimum salary of £250 a year, with allowances, as a living wage for these women; that would make the service attractive to them. The extra factors we have to consider in the district service work are the wear and tear of clothes, and the struggling against all weathers.

* References to the paragraphs in the printed statements issued as appendices to the reports of the oral evidence are given thus: "App. X. 69," and references to the oral evidence thus—Q. 1369.

A nursing service should be a good business proposition and should progressively reduce sickness benefit claims. Its business value has been recognised by the Metropolitan Life Assurance Company of New York, who, last year, spent $500,000 on nursing.

Incorporated Midwives' Institute; Scottish Midwives' Association.

(App. LXXIV. and LXXV. and Q. 19626–19793.)

Evidence was given by Miss Doubleday, Miss M. Gilligan, and Miss J. C. Barker. These witnesses indicated certain delays and other points of criticism of the administration of maternity benefit and the way in which these objections should be met. They urged that in addition to the cash payment, maternity benefit should include antenatal treatment. They also recommended that sick pay should be given for four weeks after the confinement both to the woman who is the wife of an insured person, and to the woman who is herself an insured person.

The Scottish evidence included a complaint that many general practitioners who had given up their poorer class midwifery practice were now resuming it, but employing untrained women. The Midwives' Association protest that this imperils the livelihood of their members and was a positive danger to infant life. While recognising that it was a serious offence to "cover" an unqualified woman, they said that none the less this was done.

(Q. 19664.) You would make the benefit available only if the labour has been conducted by a medical practitioner or a certified midwife?—Unless in a genuine emergency. We always allow for that.

With regard to the question whether the cash payment of maternity benefit was abused, the witnesses said that the mother was the right person to have it, although, in fact, it was sometimes misapplied.

(Q. 19652.) I do not say that the money is abused exactly. The position is this, that if they are living on the dole, as a very large number in Glasgow are just now, they are inclined to get a little bit behind with their rent, and they will say: "We will make that right when we get our maternity benefit," and it goes to the rent, or some necessary purpose, instead of to the midwife.

As regards antenatal treatment, the witnesses were asked whether this was not already given as part of medical benefit by the doctor, and they replied that a midwife undertakes her own antenatal work and advises medical supervision when it is necessary. In the case of a woman who is the wife of an insured man she is not entitled to receive medical benefit by the doctor.

The insistence of the witnesses on the fact that both antenatal and postnatal treatment so far as medical intervention was necessary called for specialist services led to the following:—

(Q. 19688–19689.) The British Medical Association have been here and have urged that every medical practitioner should, if he thinks fit, have a right to place his name on the midwifery panel. Are we to say if we adopted that recommendation we should be making a grave mistake?—I would say a very grave mistake.

You are prepared to put your opinion against that of the British Medical Association?—Yes.

(Q. 19697–19698–19699.) Is there anything left that the general practitioner can do with competence?—Yes, we are all prepared to agree with that.

We should be interested to hear it. So many people have told us there are so many things the general practitioner cannot do?—The general practitioner does deal with a normal amount of work connected with midwifery, all minor things, but I think everybody agrees that midwifery, directly it becomes abnormal at least, is a specialised subject, and they probably have not had either the time or the opportunity to concentrate upon that particular branch of the work.

National Union of Societies for Equal Citizenship.

(App. XCIX. and Q. 22975–23024.)

This Union, represented by Mrs. Hubback, is of opinion that no health insurance scheme is worthy of being called national if wives and children of the insured are excluded. They recommend the payment of allowances for the wives and children while the husband or father is unemployed owing to ill-health, the extension of medical benefit to dependants of insured persons, and the admission to voluntary insurance, after marriage, of women who have been insured workers.

Industrial Women's Organisations.

(App. C. and Q. 23025–23208.)

Dr. Marion Phillips, D.Sc., appeared for the Standing Joint Committee, which represents the whole of the organised working women of the country, whether in the political or industrial Labour movement or in coöperative organisations.

The Committee recommends extension of medical benefit to dependants, the raising of the income limit for non-manual workers from £250 to £350, and the extension of the scope of medical benefit to include every form of specialist service. The Committee further urges the adoption of the proposals of the Maternity Convention held at Washington in 1919, including the provision of adequate maintenance for mother and child.

(App. C. 27.) Such women should have the right to leave their employment six weeks before the expected birth of a child, and not be permitted to return until six weeks after, and the allowance should continue throughout the period.

The payment of what the Committee called Washington benefit—£1 a week for 12 weeks—would involve a net charge of about £1,000,000 per annum. The Committee suggests that the administration of the maternity and Washington benefits should be in the hands of the local maternity and child welfare committees. Dr. Phillips said that they were not prepared for any increase in the contributions of working women towards the cost of the new and increased benefits which were recommended. As to the panel system the witness said that it has worked fairly well, but there is a strong tendency towards an increase in the number of salaried full-time medical officers, and that it was a tendency to which the Committee saw no objection.

Amongst other points in the evidence was a suggestion that women should have a clear and full statement of their rights to sickness benefit in the antenatal period, and a statement that the witness thought that the objections of the British Medical Association to clinics was to some of the present uncomfortable clinics, where the patient has to wait for hours and get a very hurried and poor service very often in the end, and not to specialist clinics. Clinics should be supplemental to domiciliary treatment and not a substitute for it.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

Sterilisation of the Currency.

THE Academy of Medicine recently instructed a committee to inquire into the question of sterilising money and banknotes. Dr. Jules Renault, reporting the conclusions of this body, pointed out that sterilisation of money, as of all objects exposed to dirt, was theoretically desirable but at present impracticable. Fortunately, coins and notes, even the dirtiest, rarely carry pathogenic organisms; silver and bronze, indeed, have a considerable bactericidal action. Dr. Renault's researches showed that notes, if not sterile, are yet generally free from pathogenic organisms, a state of affairs probably due to the oxidation permitted by the porosity of the paper.

Alcoholism and Tuberculosis.

It has been stated that alcoholism favours tuberculosis. Dr. E. Arnould has recently studied the published statistics of this subject and concludes that more than half the fatal cases of tuberculosis in most countries occur in that section of the populace which, by reason of age, includes the fewest alcoholics. The incidence of alcoholism is always considerable in

men and women between 30 and 60 years of age, although varying in different countries; the incidence of tuberculosis, on the other hand, is always low at this age and is fairly constant in all lands. In England and Germany statistics for the last 30 years show that the consumption of alcohol per head has not diminished, while the mortality from tuberculous disease has gone down 50 per cent. English statistics from 1890–1912 show no correspondence whatever between the alcoholic mortality and the tuberculosis mortality, either for any period or for any class or profession. In France the figures show that the consumption of alcohol is sometimes a little higher in rural districts than in towns and sometimes a little lower, while the tuberculosis mortality of the country is always lower than that of towns. There seems to be no statistical correspondence between the frequency of alcoholism and that of tuberculosis.

Mental Disease Among Soldiers.

Médecin Principal (Colonel) P. M. V. Chavigny, discussing[1] mental disease in the French Army, has given it as his opinion that in peace time there is no special form of mental disease peculiar to the army, but that the cases seen by the army specialist differ completely from those that come before the asylum physician. He makes the following points. In the first place military cases are generally seen quite early, and generally, also, they are so slight that they would have escaped notice in civil life, but the military environment, in which eccentricities are seen under a magnifying glass, makes the symptoms conspicuous. Slight as they are, they are of great importance, for their consequences may be serious to the patient in the military punishments which may mistakenly occur. Colonel Chavigny instances the stupid but well-to-do young man, who moves from one of his houses to another because, he alleges, he is bored everywhere. No one bothers about this vagary of his while he is a civilian, but if he acts so in the army he has become a deserter, with the gravest penalties due from him. In France every man is drafted into the army and must be utilised somewhere, if that is possible, or man-power is wasted. If he is not fit for the fighting line, a recent decree permits his being drafted into the auxiliary services where some occupation more suited to his intelligence may be found for him. After classifying these mildly insane cases, Colonel Chavigny advises that great pains should be taken to distinguish them from the merely idle or incompetent, but avoids the practical difficulty of suggesting the methods of diagnosis, and recommends great caution in classing any as malingerers before they have had a week's observation ("this prevents regrets"). He thinks the medical officer who will treat these cases successfully must be a good clinician, must seek to sympathise with the difficulties of his patients and desire to help them, must not judge their mental processes by his own high standard, nor must he think them cured when they are only silenced. "It is easy enough to empty one's wards, but that is not the aim." He also notes the difficulty of explaining these cases to a court-martial, which does not understand them, nor does it trust the expert. His article will well repay study.

Unfounded Protests.

Quite recently some 200 patients from the Municipal Tuberculosis Sanatorium at Bicêtre, Paris, formed a silent procession through the streets to protest against the bad quality and insufficiency of the food served to them; at their head was borne a placard bearing the inscription: "Defence committee for the interests of the tuberculous patients of Bicêtre." One well-known Paris journal decided to investigate the matter, and sent a representation to visit the institution at the invitation of the director of public relief. The representative came away full of praise for what he saw, and cheered by the reports several patients gave him of their well-being. No further protests, I understand, have been made.

[1] Arch. de Médecine Militaires, May, 1925, p. 563.

International Anti-Tuberculosis Union.

The Executive Committee and the Council of the International Union against Tuberculosis at the last meeting adopted some interesting resolutions, to be presented to the next international conference in 1926. It was resolved that the following questions should be taken for discussion: (*a*) The part played by contagion in tuberculosis among adults (clinical subject); (*b*) anatomical structure of tubercle from histogenesis to cavity (biological subject); (*c*) tuberculosis and milk (social subject). Thursday, Sept. 30th, Friday, Oct. 1st, and Saturday, Oct. 2nd, 1926, are proposed for the next international conference at Washington, Dr. Theobald Smith, President of the American Association, to preside. A further resolution called attention to the need to intensify the organisation of occupational therapy, and the investigation of the relations between tuberculosis and school management.

IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

The Irish Free State and the Medical Register.

UP to the moment of writing there has been no change in the position as regards the Medical Register, and the Government shows so far no sign of yielding to the pressure of public opinion in favour of maintaining the present arrangements. The newspapers have published many protests, not only from medical teachers and members of the medical profession, but from laymen who see the dangers of the policy adopted by the Government. Almost the entire bulk of the correspondence, and of the numerous interviews given to press representatives, has been in favour of continuing the control of the profession in the Free State by the General Council. One or two individual medical men have written in the contrary spirit, and a document in favour of the change has been published by a standing committee of University College, Galway, appointed to consider all matters of a medical nature affecting the College. They say:—

"Control of Irish medical matters has been in the hands of the British Medical Council, on which Ireland has a minority representation. That the British Medical Council have worked in the interests of the profession is not disputed. The time has now arrived, however, when an Irish nation must control its own affairs, and this applies to medicine as to other matters. The action of the Government is the logical result of our present national status. The hardships which will accrue to Irish graduates when Irish medical men take charge of their own affairs has been unduly stressed. Australian and Canadian graduates may, without much difficulty, practise in England. We believe that the interests of young Irish medical men can also be protected."

This has been the only statement from any medical body in favour of the attitude of the Government. It has received two answers, written from very different angles. The first is given by "a prominent Dublin surgeon," who prefers to remain anonymous. He deals in some detail with the technical and legal difficulties involved in obtaining reciprocity or Colonial status. As regards reciprocity, the Dublin surgeon points out that if reciprocity be established, the mere fact of establishing such a relationship with the General Medical Council places the medical schools of Ireland again under its complete control.

As regards the technical mode of obtaining registrations on the Colonial List, the Dublin surgeon quotes the Medical Act of 1886 to show that—

"the applicant must prove, to the satisfaction of the Registrar to the General Medical Council, that the diploma or diplomas through which he wishes to be placed on the Colonial Register were granted to him at a time when he was not domiciled in the United Kingdom, or in the course of a period of not less than *five years*, during the whole of which he resided outside the United Kingdom."

He sums up his case as follows:—

"The Free State Government cannot obtain reciprocal arrangements with England as regards the Colonial Register unless (1) they desire to be recognised as a British possession; (2) they wish to have their medical men tried by a 'foreign' tribunal, on which they have no representation; (3) they are content to wait until five years (one and a half years more) have passed since the setting up of the Free State."

Senator Oliver Gogarty, F.R.C.S.I., in a letter to the daily press, furnishes another, if indirect, answer to the Galway statement. He suggests that it is in the mind of the Government to turn the College of Galway into an institution in which a medical education will be given in the Gaelic tongue. As such a project might be difficult to carry out while medical education is under the control of the General Council, the Government first decides to abolish that control. Strange as such a suggestion appears, Senator Gogarty appears to write in all seriousness.

The "prominent Dublin surgeon" has rendered a service in stressing the difficulties that lie in the way of obtaining any reciprocal registering arrangement with Great Britain. Many of those who wrote to the papers took for granted that reciprocal arrangements were impossible, and contented themselves with pointing out the evils of an entirely independent and separate Register. Later controversy has therefore tended to focus more and more on the relative advantages and disadvantages of the Colonial List. In this connexion a point of some importance has emerged, in that it appears that the General Medical Council cannot register, either in the Colonial List or anywhere else, a Diploma in Public Health granted outside the United Kingdom.

The President and Vice-President of the Executive Council (Mr. Cosgrave and Mr. O'Higgins) have defended their position on the platform, the basis of their arguments being that the Irish nation must control its own affairs, and summing up the present problem as "a question as to the particular place on the Register on which the names of Free State doctors will appear." Two temporising measures have been suggested in the public press as a way out of the impasse: the first is that the Government should postpone the operation of its decision for a year by passing another temporary Act, concrete and definite arrangements for reciprocity being made in the available period; and the second, emanating from the Galway College, is to the effect that a provisional medical council be appointed, consisting of representatives of licensing bodies in the Free State, and that this body should discuss with the General Medical Council the future relations.

The President and Council of the Royal College of Surgeons in Ireland have summoned a public meeting of the profession for Tuesday, Sept. 8th, at 4.30 P.M., to consider the whole situation. The Council has passed a resolution approving of the attitude taken in the controversy by the President, Mr. R. C. B. Maunsell, and expressing its confidence in his judgment. It is wisely announced that no political discussion will be permitted at the meeting, which is for the education of the public on the questions at issue.

Poor-law Reform in Dublin.

The Commissioners in charge of the affairs of the Dublin Poor-law Union have under consideration a comprehensive scheme for the reform of Poor-law administration in Dublin. They hope to separate the several classes of inmates at present in the union, and to provide suitable treatment for each group. It is understood that the St. Vincent de Paul Society, a very powerful charitable organisation, is prepared to play an important part in assisting the Commissioners towards this end. The present intention is that the society shall take over a portion of the North Dublin Union premises for the reception of all able-bodied destitute classes with a view to reforming this particular class rather than housing them. With regard to the aged people, they will be handed over to some religious order and housed outside the union. It is possible that the old age pensions will be given to many of these people. Special treatment is to be provided for mental cases in surroundings which will give them every possible chance of a recovery. There are at present 400 such cases in the wards of the union and they are neither segregated nor treated in accordance with modern methods. They will be placed under the care of specially trained sisters, and will be paid for on a capitation basis. Consumptives will be provided for on similar lines. If all the arrangements projected are carried out, the only classes that will be received in the Dublin Union premises will be those needing medical or surgical treatment, and the buildings will be turned into a modern hospital. The scheme, it is claimed, will make for proper supervision and correction of the "ne'er-do-well," better treatment for the casually destitute person, up-to-date assistance for the mentally affected, proper classification for consumptives, with suitable surroundings, the provision of a home for the reception and training of crippled, deformed, and mentally defective children.

Northern Ireland: Vital Statistics.

During the quarter ended June 30th, 7414 births were registered in the 27 superintendent registrar's districts in Northern Ireland, this number being equivalent to an annual birth-rate of 23·2 per 1000 of the estimated population. The corresponding birth-rate for England and Wales for this quarter was 19·4 per 1000 and for Scotland 22·9. The deaths registered during the quarter numbered 4913, representing an annual rate of 15·3 per 1000; the corresponding death-rate in England and Wales was 11·7 per 1000 and in Scotland 13·0 per 1000. The population of Northern Ireland in the middle of 1925 is estimated to be 1,281,000, inclusive of military.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEKS ENDED (1) AUGUST 15TH AND (2) AUGUST 22ND, 1925.

1. *Notifications.*—The following cases of infectious disease were notified during the week ended August 15th: Small-pox, 34; scarlet fever, 1400; diphtheria, 790; enteric fever, 89; pneumonia, 441; puerperal fever, 54; cerebro-spinal fever, 9; acute poliomyelitis, 10; acute polio-encephalitis, 1; encephalitis lethargica, 35; continued fever, 1; dysentery, 11; ophthalmia neonatorum, 118. There were no cases of cholera, plague, or typhus notified during the week.

Deaths.—In the aggregate of great towns, including London, there were 5 deaths from enteric fever, 18 from measles, 13 from scarlet fever, 37 from whooping-cough, 23 from influenza, and 13 from diphtheria. There were 136 deaths of children under 2 years from diarrhœa and enteritis, as compared with 108, 101, 64, 50, and 44 in the preceding weeks. In London itself there were 2 deaths from diphtheria, 3 from whooping-cough, and 5 from influenza.

2. *Notifications.*—The following cases of infectious disease were notified during the week ended August 22nd: Small-pox, 50; scarlet fever, 1336; diphtheria, 711; enteric fever, 88; pneumonia, 440; puerperal fever, 38; cerebro-spinal fever, 5; acute poliomyelitis, 16; acute polio-encephalitis, 1; encephalitis lethargica, 44; continued fever, 1; trench fever, 1; dysentery, 8; ophthalmia neonatorum, 112. There were no cases of cholera, plague, or typhus notified during the week.

Deaths.—In the aggregate of great towns, including London, there were 3 deaths from enteric fever, 31 from measles, 9 from scarlet fever, 44 from whooping-cough, 20 from influenza, and 20 from diphtheria. There were 177 deaths of children under 2 years from diarrhœa and enteritis, as compared with 136, 108, 101, 64, and 50 in the preceding weeks. In London itself there were 4 deaths from diphtheria, 8 from whooping-cough, and 2 from influenza.

Dr. J. A. Mitchell, Secretary for Health and Chief Health Officer of the Union of South Africa, is taking three months' vacation in order to represent the Union of South Africa at the Conference of Empire delegates at the Ministry of Health, to be held in connexion with the proposed International Sanitary Convention.

Correspondence.

"Audi alteram partem."

THE SUPPLY OF VACCINES TO PANEL PATIENTS.

To the Editor of THE LANCET.

SIR,—The letter of Dr. C. W. Cunnington in THE LANCET of August 22nd gives public expression to a question which I frequently hear asked by panel practitioners, and have wondered why more adequate arrangements are not made with pathologists for the supply of vaccines when required for panel patients.

In my work as pathologist I have not infrequently supplied either stock or autogenous vaccines for panel patients free of charge, for one or other of the following reasons. Either the case is so urgent that the clinical condition will not allow of the delay necessitated in obtaining official permission for the necessary vaccine preparation, or the panel practitioner obtains this help for his patients, which is not officially given; or when repayment is refused, as has happened, the pathologist has forgone remuneration for the work done on behalf of the panel service. I am sure my experience is not an isolated one. Most panel doctors are keen clinicians and want to give their patients not only the best therapeutic, but also prophylactic treatment, and are galled by the restrictions which limit adequate service being provided. The absence of these facilities for panel patients, which makes the occasional provision of gratuitous supplies necessary, introduces an obvious difficulty, for medical men hesitate or refuse to ask for the repetition of unremunerated assistance from colleagues except in very special circumstances, and therefore other cases are less adequately treated than might be.

It would not be difficult to arrange with the health insurance authorities for a standard rate for vaccines supplied for the treatment of panel patients and thus obviate such difficulties as your correspondent has encountered.—I am, Sir, yours faithfully,

E. CRONIN LOWE, M.B.E., M.B., B.S.

Southport, August 25th, 1925.

A PECULIAR SYMPTOM IN ENCEPHALITIS LETHARGICA.

To the Editor of THE LANCET.

SIR,—Since the mental sequelæ of encephalitis lethargica are attracting much attention at the present time, the following may be of interest to your readers.

Mrs. E. C., aged 25, married, a machinist by occupation, complained of insomnia of a fortnight's duration. She felt sleepy during the day and restless at night. On asking her to walk on tiptoe she staggered and said her "legs gave way." She had diplopia and consequently was unable to do her work. She complained of sore-throat and her voice was hoarse. Fine tremors of the hand could be detected on careful observation. The most interesting symptom consisted in the fact that she avoided travelling by omnibus and tramcar as it made her worse and uncomfortable, and consequently preferred to walk accompanied by her mother even a fairly long distance. Her pulse and temperature were normal.

It is difficult for me to offer a satisfactory explanation of the above symptoms, but no doubt neurologists will be able to elucidate them.

I am, Sir, yours faithfully,

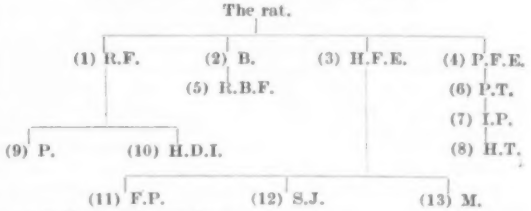
London, August 25th, 1925. J. D. DHRUV.

RAT-BORNE DISEASES.

To the Editor of THE LANCET.

SIR,—The Department of Agriculture S.S. and F.M.S. recently prepared an exhibit showing the damage done by rats to food and tropical produce for an agricultural exhibition held in Kuala Lumpur. The Institute for Medical Research was asked to collaborate by arranging a demonstration of the dangers of rats to public health, and the attached table of diseases of rats, which are communicable to man, was drawn up for the exhibit. As the table may be useful for other exhibitions and for propaganda during "rat weeks" I am forwarding a copy for publication.

Human Diseases Spread by Rats.



(1) R.F. = By the rat flea.
(2) B. = By biting.
(3) H.F.E. = By contaminating human food with excreta.
(4) P.F.E. = By contaminating pig's food with excreta.
(5) R.B.F. = Rat bite fever.
(6) P.T. = Pig trichinosis.
(7) I.P. = By eating imperfectly cooked infected pork.
(8) H.T. = Human trichinosis. (Trichina is a worm which, in its embryo stage, lives in the muscles.)
(9) P. = Plague.
(10) H.D.I. = Hymenolepis diminuta infection (a small tapeworm).
(11) F.P. = Food poisoning.
(12) S.J. = Spirochætal jaundice.
(13) M. = Melioidosis (a glanders-like disease).

I am, Sir, yours faithfully,

A. NEAVE KINGSBURY,
Pathologist, Institute for Medical Research,
Kuala Lumpur, Federated Malay States.

July 18th, 1925.

ASCARIS LUMBRICOIDES AND PIGS.

To the Editor of THE LANCET.

SIR,—I was very interested in the annotation in your issue for July 18th, *Ascaris lumbricoides* in Hertfordshire. Here in Port Said, for some reason not hitherto explained, about 90 per cent. of the Egyptian population (Port Said, European 13,000, Egyptian 67,000) are infected with ascaris, and it has always been a puzzle why this should be so as the rest of Egypt does not show such a high percentage for ascaris (about 4 per cent.). Your annotation probably puts us on to the origin of the trouble—pigs. In Port Said pigs are bred for the crews of the passing ships. The result is a vast herd of pigs feeding on the town rubbish dump near the destructors and, I suppose, hence the ascaris. The water-supply at Port Said is one of the purest and best in the world and is quite above suspicion.

I am, Sir, yours faithfully,

H. E. S. STIVEN, M.D. Camb.,
Principal Medical Officer, Government Hospital,
August 8th, 1925. Port Said, Egypt.

ALL SAINTS' HOSPITAL.

To the Editor of THE LANCET.

SIR,—May I draw your attention to the fact that in the Students' Number of THE LANCET there is no mention of this hospital among the supplementary hospitals giving courses of instruction.

Courses of instruction are given at the out-patient department, 49–57, Vauxhall Bridge-road, S.W. 1, on Monday, Wednesday, Thursday, and Saturday afternoons at 1.30, and on Monday, Wednesday, and Thursday evenings at 6.30; opportunities are afforded for the seeing of operations performed daily at the in-patient department at 91, Finchley-road, N.W. 8.

I am, Sir, yours faithfully,

ELIZABETH HART.
Assistant Secretary.

Vauxhall Bridge-road, S.W., August 29th, 1925.

Obituary.

JOHN FREDERICK GORDON DILL, O.B.E., M.D. CAMB., M.R.C.S. ENG., M.R.C.P. LOND.,

CONSULTING PHYSICIAN TO THE ROYAL SUSSEX COUNTY HOSPITAL.

WE announced last week the regretted death of Dr. J. F. Gordon Dill at the age of 66, which occurred at his residence in Hove on August 22nd.

Dr. Gordon Dill was the eldest son of the late Dr. Richard Dill, a well-known medical practitioner in Brighton and Hove, by his wife, the daughter of General Sir Charles Wale, K.C.B.—she only died in May last at the age of 101. Dr. Richard Dill had succeeded an uncle in practice at Brighton, thus making a long hereditary connexion.

John Gordon Dill was educated at Gonville and Caius College, Cambridge, and St. George's Hospital. At the University he graduated in honours in the Natural Science Tripos, and was well known also on the running-track and, perhaps especially, as a footballer under Association rules. He completed his medical education at St. George's Hospital, took the Cambridge M.B., and, after holding certain resident appointments, went to Paris to study under Charcot. At that time his inclination was towards entering into special practice in London, but on his return he decided to carry on his father's work at Brighton and Hove. Here he succeeded to and enlarged a prominent practice, while he was elected at the first opportunity upon the staff of the Royal Sussex County Hospital.

For the next 30 years Dill's name was associated with all medical movements in the town and county. He was at different times chairman of the Brighton Medical Association, president of the Sussex Medical Society, and physician to the Sussex Dental Hospital, as well as physician to the County Hospital, and in all his posts his wisely tolerant attitude, coupled with his energetic mind, made him early to see the places in which the organisation of the medical profession was weakest and enabled him to discern that the places were those in which the public interests had to be considered equally with those of the practitioner. He was an ardent champion of the right of the general practitioner to occupy an important place in all the national developments of medicine foreshadowed under the National Insurance scheme, while from his intimate acquaintance with hospital administration he could realise out of personal experience the fundamental troubles associated with the poverty of voluntary hospitals, the tragedy of bed shortage in the institutions coupled with their long waiting-lists, and the difficulties of dealing with hospital abuse—subjects upon all of which he wrote much and judiciously and on occasions spoke with great clearness. The concrete form which his energies finally took was the foundation of the Sussex Provident Scheme by which hospital benefits and additional medical services were to be brought economically within the reach of the proper subjects. This scheme, of which the full details have been published on several occasions in THE LANCET, gained in the end, and after some criticism, the approval of the medical profession in the county of its origin, and soon began to attract attention elsewhere. It was a scheme designed to supply medical service which should debar no one from obtaining every accepted means of diagnosis and treatment, the essential aim being to supply a service which the patient could afford and which at the same time brought a fair remuneration to the doctors. The scheme rolled nine coöperating general and special hospitals together on a uniform basis, urgent cases being admitted to the hospitals as already arranged for, while other cases requiring operation or consultation were placed upon waiting-lists, such patients, however, taking no precedence of urgency cases. The consultation fees were drawn from a pool formed by deducting a percentage of the moneys allotted to each hospital, and it was Dill's hope that, if and when his scheme in Sussex could be proved successful, a similar plan would be applied to conditions ruling in other areas. His ideas took further practical shape in the foundation of the British Provident Association, when in 1921, with the assistance of Viscount Knutsford, Sir Arthur Stanley, Sir Alan Anderson, Lord Dawson, and Mr. McAdam Eccles, he set up the National Provident Scheme for hospital and additional services. This scheme, which during the intervening years has done excellent work and has developed into the British Provident Association as now known, owed its conception to his imaginative faculty. As secretary of the original scheme and of its permanent successor he gave of his time and energies without stint, and the results achieved are a proof of his sagacity as well as a justification of his enthusiasm for the welfare of his fellows. As far as Sussex is concerned, the last figures published showed that 26,500 members of the public were entitled to the benefits of the scheme, and that in 1924 over £5500 were paid through its channels to the hospitals for services rendered to the subscribers. It is understood that the figures for the first six months of the present year have an equally good or better promise.

In October last year Dill was compelled to undergo a serious operation from which at the time he made a successful recovery, but the relief proved only temporary, and the sad end was not unexpected by many of his friends.

Dr. Gordon Dill married Mary, daughter of the late Simon Martin, of the Indian Civil Service and son of the well-known consulting physician to the India Office, Sir Ronald Martin, by whom he had two sons. He leaves behind him the memory of an able and generous man whose talents as well as his personal charm had endeared him to a wide circle.

JAMES STEWART FOWLER, M.D., C.M., F.R.C.P. EDIN.

Dr. J. Stewart Fowler, physician to the Royal Hospital for Sick Children, Edinburgh, died on August 24th in Elie, Fifeshire, at the age of 55. By his untimely death Edinburgh in particular and the medical profession in general has lost a valuable member.

James Stewart Fowler was the son of Dr. James Stewart Fowler, of Georgetown, Demerara, and was educated at the Edinburgh Academy. He received his professional training at Edinburgh University, where he graduated M.B., C.M. in 1892, taking in the same year the English double qualification. As a student he had a distinguished medical career, gaining honours on graduation, along with the Allan Fellowship, the Gunning Victoria Scholarship, and the McCunn Scholarship. He was keenly interested in the Royal Medical Society of Edinburgh, of which he was a Fellow and past president. After the usual hospital appointments in Edinburgh he went abroad to study in Vienna, and in 1899 took the M.D. Edin., being awarded a gold medal for his thesis. In 1895 he became a member of the Royal College of Physicians of Edinburgh and two years later obtained the Fellowship of the College with which he has been so closely associated ever since. Dr. Fowler practised as a physician, and was a sound authority on the diseases of childhood. He was senior physician to the Royal Hospital for Sick Children and University lecturer in diseases of children at that hospital, physician to Chalmers Hospital, and honorary pediatrician to the Royal Maternity Hospital. Formerly he held posts as assistant physician to Leith Hospital and physician to the New Town Dispensary of Edinburgh. During the war he acted as temporary captain in the R.A.M.C., and was on active service with the forces in Salonica. In 1918 he was appointed secretary and registrar of the Royal College of Physicians of Edinburgh, which post he held up to the time of his death. He was a member of the Association of

Physicians of Great Britain and the Medico-Chirurgical Society and Pathological Club of Edinburgh, and took a great deal of interest in the proceedings of these societies.

Dr. Fowler made many valuable contributions to medical literature, and at the time of his death was joint editor of the *Edinburgh Medical Journal*. In 1899 he published, in joint authorship with Dr. G. Elder, "Diseases of Children: a Clinical Handbook," and in 1909 appeared his "Artificial Feeding of Infants." Both of these books have proved valuable works of reference. Among his contributions to various compilations and journals are the following: an article on Mumps in the Encyclopædia Medica (1901); Diseases of the Genito-Urinary System in Garrod, Batten, and Thursfield's Diseases of Children; Splenic Anæmia of Infancy, *Brit. Med. Jour.* (1902); Epidemic Cerebro-Spinal Meningitis, *Rev. Neurol. and Psychiatry* (1907); and, with Dr. Carnegie Dickson, Tuberculous Sclerosis, *Quart. Jour. Med.* (1910).

A colleague writes: "The unexpected suddenness of Dr. Fowler's death has come as a great shock to his many friends. Up till a few hours before the end he had been in his usual good health, and indeed on the morning of August 24th he had been on a boating expedition with his daughter and a friend. In the afternoon he felt ill, became unconscious, and passed away in the evening. As a skilled and sympathetic physician he was greatly loved, and his charm endeared him particularly to those very young children amongst whom he did the greater part of his work."

Dr. Fowler was married in 1902 to Edith, daughter of Mr. Philip Hudson, C.E., of Hyderabad, who predeceased him 11 months ago. He leaves one daughter.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt. J. J. H. Rooney is placed on the Retd. List with the rank of Surg. Capt.

Surg. Comdrs. A. H. Joy to the *Pembroke* for R.N. Barracks, temp.; F. L. Smith to the *Furious*, on commg.; and S. F. Dudley to *Diomede*, on recommg. (lent to N.Z. Division).

Surg. Lt.-Comdr. L. W. Gommell to the *Comus*, on commg.

Surg. Lts. E. B. Pollard to the *Columbine* for Port Edgar Base, temp.; S. Morrow to the *Furious*, on commg.; and S. G. Rainsford to *Pembroke* or R.N. Hospital, Chatham.

ROYAL NAVAL VOLUNTEER RESERVE.

J. Stephen, late Temp. Surg., and Proby. Surg. Lt. A. S. Bradlaw to be Surg. Lts.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. F. W. W. Dawson retires on ret. pay.

Capt. R. P. Cormack is granted the temp. rank of Maj. whilst empld. as Dep. Asst. Dir. of Pathology.

Capt. W. E. Tyndall relinquishes the temp. rank of Maj. on ceasing to be empld. as a Dep. Asst. Dir. of Pathology.

Capt. D. C. Bowie is restd. to the Estabt.

Capt. G. C. Robinson is placed on the half-pay list on account of ill-health.

ARMY DENTAL CORPS.

Temp. Capt. A. S. Newton, Dental Surg., relinquishes his commn. and retains the rank of Capt.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Qrmr. and Capt. F. C. Strike, having attained the age limit of liability to recall, ceases to belong to the T.A. Res. of Off., and retains his rank.

SUPPLEMENTARY RESERVE OF OFFICERS.

Capt. A. G. B. Duncan, late temp. Capt. R.A.M.C., to be Capt.

ROYAL AIR FORCE.

Flight Lt. D. G. Boddie is promoted to the rank of Squadron Leader.

Flight Lt. G. M. Mellor relinquishes his temporary commission on ceasing to be employed and is permitted to retain his rank.

Capt. A. B. H. Cole, Army Dental Corps, is granted a temporary commission as a Flight Lt. on attachment to the R.A.F. for a period of four years.

Flight Lt. J. Wren (Capt., Army Dental Corps) relinquishes his temporary commission on return to Army duty.

INDIA AND THE INDIAN MEDICAL SERVICE.

The King has approved the retirement of Lt.-Cols. L. Hirsch (on account of ill-health), J. C. G. Kunhardt, and H. A. F. Knapton.

Capt. S. N. Hayes, Civil Surgeon, Dalhousie, is appointed Professor of Midwifery, King Edward Medical College, Lahore. Maj. E. W. O'G. Kirwin, Civil Surgeon, Murshidabad, is appointed to act as Superintendent, Central Medical Hospital, Berhampore, during the absence on deputation of Capt. J. E. Dhunjibhoy. Maj.-Gen. D. J. Collins, Deputy Director of Medical Services, Southern Command, officiates as Director of Medical Services in India, Army Headquarters, during the absence on leave of Maj.-Gen. O. L. Robinson. The services of Maj. J. A. S. Phillips, Assistant Director of Public Health (Malariology), United Provinces, are lent temporarily to the Government of Nepal for malaria work. Lt.-Col. Godfrey Tate, V.H.S., officiating Inspector-General of Civil Hospitals, Punjab, is appointed President of the Punjab Medical Council, vice Col. C. R. Bakhle, resigned.

The King has been pleased to give directions for the appointment of John Owen Shircore (Director of Medical and Sanitary Services) to be an Official Member of the Executive Council of the Tanganyika Territory.

Medical News.

SOCIETY OF APOTHECARIES OF LONDON.—At examinations held recently the following candidates passed in the subjects indicated:—

Surgery.—T. K. Clifford, Manchester; C. D. Cogswell, King's Coll. Hosp.; V. G. Crowley, Sydney; S. W. Cuff, St. Bart.'s Hosp.; A. L. Evans, London Hosp.; W. O. H. Evans, Bristol; T. H. Harrison, Sheffield; A. H. Henson, Charing Cross Hosp.; J. Herbert, Guy's Hosp.; E. P. Hyde, Manchester; A. B. Osbourne, St. Mary's Hosp.; W. Irving Pierce, Boston; F. Reynolds, Manchester; H. A. Sack, Middlesex Hosp.; G. H. Shanley, Durham; M. Schwartzman, Odessa and Middlesex Hosp.; and I. Waynik, Charing Cross Hosp.

Medicine.—C. D. Cogswell, King's Coll. Hosp.; W. Hinds, Durham; E. P. Hyde, Manchester; and M. V. Roberts, London Hosp.

Forensic Medicine.—O. Bastable, Leeds; E. P. Hyde, Manchester; E. J. Newman and M. V. Roberts, London Hosp.; and I. Waynik, Charing Cross Hosp.

Midwifery.—R. F. Ashkenny, Cambridge and London Hosp.; A. L. Evans, London Hosp.; W. Ivers, Manchester; E. H. Rampling, St. Thomas's Hosp.; M. V. Roberts, London Hosp.; and C. H. Spencer, Manchester.

The Diploma of the Society was granted to the following candidates entitling them to practise medicine, surgery, and midwifery: A. H. Henson, J. Herbert, W. Irving Pierce, A. B. Osbourne, and I. Waynik.

THE FELLOWSHIP OF MEDICINE.—The Fellowship of Medicine and Post-graduate Medical Association (1, Wimpole-street, W.) will provide an intensive course in general medicine, surgery, and the various special departments at the Westminster Hospital from Sept. 21st to Oct. 2nd from 10.30 A.M. to 5.30 P.M. each day. The fee for the course is 3 guineas or 2 guineas for either week. At the Infants Hospital a two weeks' comprehensive course dealing with the study of diseases of infants will be held from Sept. 7th. Three visits will be made to centres away from the hospital. The Seamen's Hospital will begin a five weeks' course in operative surgery from Sept. 7th. Classes will be held four times weekly, and the fee is fixed at £10 10*s*. In dermatology an afternoon course will be provided at Blackfriars Skin Hospital from Sept. 7th to 19th. A special demonstration of interesting cases will be given on Sept. 8th. The Royal Westminster Ophthalmic Hospital has arranged a three weeks' course from Sept. 7th. Clinical instruction will be given every afternoon, and special demonstrations three times weekly. From Sept. 21st to Oct. 3rd the Brompton Hospital provides a special course covering the various aspects of pulmonary disease by lecture, demonstration, &c. On four successive Wednesdays, beginning Sept. 23rd, Dr. C. B. Heald will give special demonstrations on treatment by electrotherapy at the Royal Free Hospital at 5.30 P.M., the course being designed for general practitioners. Full particulars and syllabuses of the courses, together with the Fellowship programme, may be obtained from the secretary.

BRITISH MOSQUITO CONTROL INSTITUTE. — The opening of the new house of this Institute on Hayling Island by Sir Ronald Ross on Monday last was a public recognition of the valuable work done by a non-professional worker. Mr. John F. Marshall, the founder of the Institute, has devoted himself to the investigation and elimination of the mosquito from Hayling Island. From this nursery originate nearly all the mosquitoes that torment our coast towns in the late summer, and the general public owes a considerable degree of increased comfort on holiday to the efforts of Mr. Marshall and his fellow workers. The fourth report of the Institute describes the work undertaken, at a cost of £180, to clear the numerous breeding-places of the salt-water mosquito, *Ochlerotatus detritus*, and the fresh-water larvæ of *O. rusticus* and *Theobaldia annulata*. A valuable auxiliary corps was found in the "mosquito control class" of local school-children, who were taught how to identify and collect specimens of mosquitoes and larvæ. Many breeding-places have been located by the children. The original local work extended so rapidly that Mr. Marshall determined to erect a special building for research into the problems of mosquito control, and to inaugurate a "British Mosquito Control Institute." Many distinguished scientists have become members of its council and the opening ceremony was attended by a large party from the British Association. The Institute contains a demonstration museum, laboratory, drawing and record offices, photographic rooms, and a mechanical workshop, in addition to the well-equipped research rooms. Sir Ronald Ross, in his speech, said that 30 years ago, when he started work on malaria and mosquitoes in India, there was not a single satisfactory book or article on the mosquito. Now there was much knowledge, but energy to act upon the knowledge was still needed to carry on the work begun in Ismailia, Panama, and the Malay States. The ultimate aim must be to control all the dangerous and unpleasant pests that affect man, his crops, and his herds. He urged a great increase in the amount of money devoted to research. Colonel James, representing the Ministry of Health, seconded the vote of thanks to Mr. Marshall proposed by Mr. Tate Ryan, President of the Zoological Section of the British Association. Colonel James said that the success of public health administration was very largely due to the voluntary assistance received from public-spirited persons, adding that the Ministry of Health would watch Mr. Marshall's work with keen and helpful interest.

ROYAL SANITARY INSTITUTE.—The autumn course of lectures and demonstrations for sanitary officers commences at the Institute on Wednesday, Sept. 23rd. The course comprises the subjects scheduled for the examinations of the Institute and the Sanitary Inspectors' Examination Board (formed by the Institute and other bodies). On Friday, Oct. 2nd, a course of systematic practical training in the inspection of meat at a cattle market, &c., will be opened for meat and food inspectors. A detailed programme of the courses and full particulars may be obtained from Mr. E. White Wallis, F.S.S., director and secretary of the Institute, 90, Buckingham Palace-road, London, S.W. 1.

INSANITY AND MENTAL DEFICIENCY IN SCOTLAND. The annual report of the Scottish Board of Control, which has just been issued, states that the number of insane and mentally defective persons under the Board's supervision on the first day of the present year was 20,850, of whom 18,398 were certified insane—almost exactly the same number as in the preceding year. Certified mental defectives have, however, increased from 2308 to 2452. The proportion of recoveries calculated on the admissions during the year was 33·4, which is 3·4 above the average of the previous five years. There was a substantial increase in the number of voluntary inmates. The Board express the hope that the contemplated scheme for the establishment of colonies for the adult mentally defective will reduce to a minimum the practice of placing of such patients in asylums.

ROYAL MEDICAL BENEVOLENT FUND.—At the last meeting of the Committee 54 cases were considered and £663 was voted to 43 applicants. The following is a summary of the new cases relieved :—

M.R.C.S., L.R.C.P., 1893, aged 59. Married, six children, aged 5 to 18 years. Eldest tea-planting in Ceylon at Rs.400 a month. The rest live at home and attend school. Income from practice and panel dispensary about £230 per annum. Rent and rates £66 per annum. Applicant was taken suddenly ill in July and was operated on for gangrenous bladder. Nursing home fees were paid by his colleagues in the profession, but it was discovered that the wife and family were without means. The Fund sent £10 at once.

Widow, aged 58, of L.R.C.P. Edin. who was a ship's surgeon and died abroad in 1923. Applicant has managed to keep herself and invalid sister on the little money left and by the sale of trinkets and jewellery. This being exhausted a large debt was accumulating for board and lodging when a doctor on the Committee of the Fund heard of the case and referred her to the Fund. An immediate grant of £5 was made for food. The Professional Classes Aid Council were asked to contribute towards the maintenance of the sister of the applicant, who is the unmarried daughter of a solicitor. A vote from them enabled the sister to be got away to be looked after as she is an invalid and crippled with rheumatoid arthritis, and our Guild found a post for the applicant and made a grant towards the debt outstanding for board and lodging. The Fund and Guild and Professional Classes Aid Council are working together to get the sister permanently looked after so that the applicant will be self-supporting.

Widow, aged 45, of L.R.C.P. Edin. who practised in Lancashire and died this year. She is left with three children, aged 6, 9, and 12, who are all at day school. After the practice was sold £500 was left and War Loan purchased. Applicant hopes to augment income by letting apartments. A report from the local branch of our Guild supported the application and the Fund voted £18 towards education and referred it to the Guild to consider a similar grant.

Widow, aged 36, of M.B. who practised in the Midlands and died in 1916. Applicant has been able to support herself and son, who is now 9 years of age, up to last November, when her mother died who looked after the boy whilst the applicant was at work. Help is asked for the child. The guardians have been applied to and a grant was made by them of 7*s.* 6*d.* a week for five weeks. The Fund voted £10 to a local doctor, who is interested in the case, to be administered for the benefit of the child.

M.R.C.S. Eng., aged 62, who is in practice and asks the Fund to help him while getting established. The practice is increasing, but he has only £42 in hand. Fund voted £40.

Widow, aged 54, of L.M.S.S.A. who practised as a ship's surgeon and died suddenly, leaving applicant and daughter, aged 17, totally unprovided for. Has been working as a servant but at present staying with friends. Voted £26 in six monthly instalments.

Subscriptions may be sent to Sir Charters Symonds, Hon. Treasurer, at 11, Chandos-street, Cavendish-square, London, W. 1.

HOSPITAL ADMINISTRATION.—A three months' course of lectures and demonstrations will be given at the North-Western Hospital, Lawn-road, Hampstead, N.W., by the medical superintendent, Dr. E. W. Goodall, on Mondays and Thursdays, at 4.45 P.M., and alternate Saturdays at 10.30 A.M., beginning Oct. 1st. The fee is £4 4*s.*, and the course complies with the requirements of the revised regulations of the General Medical Council for the D.P.H. Further particulars may be obtained from the Clerk to the Metropolitan Asylums Board, Victoria Embankment, E.C. 4.

POST-GRADUATE COURSES IN TUBERCULOSIS.—The following courses have been arranged by the Joint Tuberculosis Council: (1) A fortnight's course, Sept. 21st to Oct. 3rd, at Victoria Park (class limited to six members); (2) a course in non-pulmonary tuberculosis, Sept. 28th to Oct. 3rd, visiting Ascot, Carshalton, London Hospital, Royal College of Surgeons, All Saints' Hospital for Genito-Urinary Diseases, and Oxford (class limited to 30 members). Early application should be made to William Brand, acting hon. secretary, 19, Brunswick-square, S.E. 5, who will supply all further particulars (in addition to those published in THE LANCET on August 22nd, p. 412).

THE PEOPLE'S LEAGUE OF HEALTH.—The Sims Woodhead series of constructive educational health lectures will commence on Friday, Oct. 9th, at 6 P.M., at the Regent-street Polytechnic, London, and will be continued on the following five Fridays at the same hour. Among those who have promised to lecture are: Sir Harry Baldwin, Dr. Leonard Hill, Prof. H. R. Kenwood, and Mr. E. B. Turner. At the conclusion of the series there will be an optional examination for those who have attended the series, and certificates will be issued by the Medical Council of the League. The fee for the series is 7*s.* 6*d.*, single lectures 1*s.* 6*d.* Tickets and further information regarding the lectures held may be obtained from Miss Olga Nethersole at 12, Stratford-place, London, W. 1.

ARTIFICIAL SUNLIGHT AT DRURY LANE THEATRE. On August 26th Sir Alfred Fripp formally opened the artificial sunlight baths which have been installed at Drury Lane Theatre for the benefit of the company and staff. In opening the proceedings Sir Alfred Butt said that the directors believed that the greatest possible benefit would result from conserving the health of their employees, and the baths had been provided with this object. Every member of the company and staff could have a sunlight bath when desired, free of charge, provided the doctor approved. Sir Alfred Fripp gave a short address on the benefit of artificial sunlight and of the advantages of living as near to nature as possible; he said that he knew several prominent actors who had been greatly benefited by artificial sunlight baths, and congratulated the Drury Lane authorities on their generous action in providing this means for promoting the health of their staff and company. The installation is under the supervision of Dr. F. Howard Humphris, and Dr. Cecily Maude will be in charge at the theatre. The total radiation value is 100,000 candle-power and provides for about 60 baths per hour.

Medical Diary.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Sept. 7th, to SATURDAY, Sept. 12th.—HOSPITAL FOR DISEASES OF THE SKIN, Blackfriars. Daily instruction in the out-patient department from 2.30 P.M. Special demonstration of cases on Tuesday.—INFANTS HOSPITAL, Vincent-square, S.W. Special Course. Lectures and demonstrations every afternoon. "Round Table" consultation on Friday, and on Saturday special visit to Model Pasteurising Plant.—ROYAL WESTMINSTER OPHTHALMIC HOSPITAL, Charing Cross. Clinical instruction every afternoon from 2 o'clock with special demonstration three times a week.

Appointments.

CAPON, N. B., M.B., Ch.B. Liverp., has been appointed Hon. Physician to the Royal Southern Hospital, Liverpool.

LAIRD, JEAN P., M.B., Ch.B. St. And., Junior Resident Medical Officer, East House and Hospital, Dundee.

THOMSON, I. S., Ch.B. Aberd., D.P.H. R.C.P.S. Eng., Assistant Medical Officer of Health and Tuberculosis Officer for Westminster.

Royal Infirmary, Sunderland: ROBINSON, W. V., B.M., B.Ch. Oxf., and HAMILTON, NORAH, M.B., B.S. Durh., Anæsthetists. MILNE, J., M.B., Ch.B., Deputy Anæsthetist. ROBINSON, V. P., B.M., B.Ch. Oxf., House Physician.

St. Paul's Eye Hospital, Liverpool: GORST, P. E., M.D. Liverp., M.R.C.S., L.R.C.P.; PLUMMER, F. C., M.D. Liverp.; and GRAVES, B., M.R.C.S., L.R.C.P., Hon. Surgeons. BICKERTON, H. R., M.B., B.Ch. Camb., M.R.C.S., L.R.C.P., D.O. Oxf., D.O.M.S. Lond.; HUGHES, E. N., L.R.C.P., M.R.C.S., D.O.M.S. Eng.; and MOORHOUSE, I. H., M.B., Ch.B. Liverp., Hon. Assistant Surgeons.

Westminster Hospital: DUNLOP, H. A., M.R.C.S., L.R.C.P., Lond., House Physician; and DAVIES, A. E. C., M.R.C.S., L.R.C.P. Lond., House Surgeon.

Certifying Surgeons under the Factory and Workshop Acts: ANDERSON, D. I., M.B., Ch.B. Edin. (Hoddesdon, Hertford); CONYNGHAM, R. S., L.R.C.P. & S. Irel. (Snaith, West Riding); WILLIAMS, R. E., (Torpoint, Cornwall); and BOLTON, N. H. (Wrotham, Kent).

Vacancies.

For further information refer to the advertisement columns.

Ayr County Hospital.—Jun. H.S. £80.

Bradford Royal Infirmary. H.P. £150.

Brighton County Borough Sanatorium.—Res. M.O. £350.

Chiswick General Hospital.—Hon. Anæsthetist and Hon. Asst. Anæsthetist.

Denbigh County Council.—Asst. M.O. £600.

Dewsbury and District General Infirmary.—H.S. £200.

Dreadnought Hospital, Greenwich.—H.P. and H.S. Each at rate of £110.

Halifax Royal Infirmary.—Third H.S. At rate of £150.

Hampstead, New End Hospital.—Jun. Res. Asst. M.O. At rate of £150.

Hospital for Tropical Diseases, Endsleigh Gardens, N.W.—H.P. at rate of £110.

Hospital for Women, Soho-square, W.—Res. M.O. At rate of £100.

Lancaster County Mental Hospital.—Temp. Asst. M.O. 7 guineas weekly.

Lister Institute of Preventive Medicine, Chelsea Bridge-road, S.W.—Jenner Memorial Research Studentship. £250.

London School of Hygiene and Tropical Medicine, Endsleigh-gardens.—Director of Medical Entomology. £900.

Manchester and District Radium Institution.—Asst. Radiologist. £500.

Manchester Royal Children's Hospital, Pendlebury.—Asst. M.O. At rate of £150. Res. Surg. O. At rate of £80.

Manchester, St. Mary's Hospitals.—Three H.S.'s. Each at rate of £50.

Metropolitan Ear, Nose, and Throat Hospital, Fitzroy-square, W.—Anæsthetist.

Newcastle-upon-Tyne, Royal Victoria Infirmary.—H.P.'s, H.S.'s, &c. Each at rate of £50.

Norwich, Norfolk and Norwich Hospital.—H.S. £150.

Nottingham Children's Hospital.—Res. H.P. and Res. H.S. Each at rate of £150.

Pharmacological Laboratories of the Pharmaceutical Society of Great Britain.—Director. £1200.

Prince of Wales's General Hospital, Tottenham, N.—H.S., Spec. H.S., and H.P. Each at rate of £150. Also Jun. H.S. and Jun. H.P. At rate of £110.

Queen Mary's Hospital for the East End, Stratford, E.—Cas. O.

Queen's Hospital for Children, Hackney-road, Bethnal Green, E.—H.S., H.P., and Cas. H.S. Each at rate of £100.

Radium Institute, 16, Riding House-street.—Cancer Research Worker. £500.

Rochdale Infirmary and Dispensary.—Jun. H.S. £200.

Royal National Orthopædic Hospital.—H.S. At rate of £150.

Royal Northern Hospital, Holloway, N.—M.O. to Out-patients. At rate of £125. Also H.S. and Obstet. H.S. Each at rate of £70.

St. Bartholomew's Hospital and College.—Res. Asst. Phys.-Accoucheur and Demonstrator of Pract. Midwifery.

Salford County Borough.—Asst. Clin. Tub. O. £600.

Salford Royal Hospital.—Res. M.O. and H.S. At rate of £175 and £125 respectively. Also Radiologist. £300.

Singapore, Straits Settlements.—Two Asst. Health Officers. $7200.

Southern Rhodesia Government Public Health Dept.—Dentist. £650.

West London Hospital, Hammersmith-road, W.—H.P. and Two H.S.'s. Each at rate of £100.

Whipp's Cross Hospital, Leytonstone.—Res. Asst. M.O. £350.

The Chief Inspector of Factories, Home Office, London, S.W., announces a vacant appointment for a Certifying Factory Surgeon at Bexhill, Sussex.

Births, Marriages, and Deaths.

BIRTHS.

BERRY.—On August 30th, at Glenthorne, Park-avenue, Watford, the wife of D. H. Berry, M.R.C.S. Eng., L.R.C.P. Lond., of a daughter.

BROWN.—On August 19th, at Bassett-crescent, Southampton, the wife of Dr. A. W. Brown, of a daughter.

GRAHAM-HODGSON.—On August 17th, at Grey Lodge, Chislehurst, the wife of Dr. Graham-Hodgson, of a daughter.

HAULTAIN.—On August 26th, at Walker-street, Edinburgh, the wife of W. F. Theodore Haultain, F.R.C.S.E., of a son.

RAMMELL.—On August 17th, at Swaffham, Norfolk, the wife of Dr. J. Rammell, of a daughter.

THOMPSON.—On August 23rd, at Eastbourne House, Devizes, the wife of James Thompson, F.R.C.S., of a daughter.

MARRIAGES.

BROADBRIDGE—HEAD.—On August 20th, at St. Marylebone Parish Church, Harold George Broadbridge, M.B., B.S. Lond., to Enid Muriel, only daughter of the late Mr. and Mrs. Robert Head.

CANNING—TURTON.—On August 19th, at St. Saviour's, W., Henry George Richmond Canning, L.R.C.P., M.R.C.S., L.D.S. Eng., to Ruth Helen Gwenyth, only daughter of Mr. and Mrs. Turton, of Tintagel, Cornwall.

COWELL—SMITH.—On August 22nd, at Bideford Church, Dr. S. J. Cowell, to May Penelope, eldest daughter of Mr. and Mrs. Cecil Smith, of Link House, Westward Ho!

MCGRATH—TYNDALL.—On August 12th, at Blackrock, Co. Dublin, William M. McGrath, M.B., B.Ch., B.A.O., Cane Hill Mental Hospital, Coulsdon, Surrey, to Eileen, elder daughter of the late Mr. J. P. Tyndall, "Farmleigh," Stillorgan, Co. Dublin, and Mrs. Tyndall, Eaton-square, Monkstown, Co. Dublin.

OVERTON—BROMAN.—On August 26th, at the Savoy Chapel, Squadron-Leader R. S. Overton, M.R.C.S. Eng., L.R.C.P. Lond., R.A.F., of Sutton Lodge, Sutton, Surrey, to Justine Leontine ("Jean") Broman, of Oslo, Norway.

WHITAKER—WAITE.—On August 29th, at Knutsford, Cheshire, Sydney Morgan Whitaker, M.D. Brux., M.R.C.S. Eng., L.R.C.P. Lond., of St. Helier, Jersey, to Hilda Mary, widow of Lieut. J. Thorp Waite, 5th East Kent Regiment (The Buffs), and elder daughter of the late Frederic Smith, of Dunham Lawn, Bowdon, Cheshire.

DEATHS.

ACKLAND.—On August 17th, at The Circus, Bath, Donald Ackland, M.R.C.S., L.R.C.P. Lond., aged 50.

BRAMWELL.—On August 26th, at Corfe, Taunton, Herbert Bramwell, M.D., F.R.C.S. Edin., M.R.C.S. Eng., late Lieut.-Colonel, Gloucestershire Hussars, T.D., son of the late John Byrom Bramwell, of Tynemouth, Northumberland, aged 62.

BURROWES.—On August 16th, at Lemain, Looe, Cornwall, Henry Ambrose Burrowes, M.D., aged 60.

DILL.—On August 22nd, John Frederick Gordon Dill, M.D., Denmark Villas, Hove, aged 66 years.

DUNBAR.—On August 25th, suddenly, at Oakfield-road, Clifton, Bristol, Eliza L. Walker Dunbar, M.D. Zurich, L.R.C.P.I. and L.M., younger daughter of the late Alexander Walker, M.D., H.E.I.C.S., in her 80th year.

FOWLER.—On August 24th, at Brachead, Elie, suddenly, James Stewart Fowler, M.D., F.R.C.P. Edin., of Northumberland-street, Edinburgh, aged 54.

LANGDON-DOWN.—On August 19th, at Dixland, Teddington, Percival Langdon Langdon-Down, aged 57.

MARSHALL.—On August 24th, at Hove, John James de Zouche Marshall, V.D., L.R.C.S.I., L.M., L.A.H. Dub., Lieut.-Colonel (retired) R.A.M.C., T., aged 79.

ODELL.—On August 21st, at Ferndale, Torquay, William Odell, M.D., F.R.C.S., aged 74.

WALES.—On August 18th, at Downham Market, Thomas Garneys Wales, M.R.C.S., in his 93rd year.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

HOSPITAL ORGANISATION.

To those concerned with the present problem of meeting the hospital needs of this country the series of handbooks on Hospital Organisation, Construction, and Management, published by the Macmillan Company of New York, should prove instructive. The first of the series, by Joseph J. Weber, M.A., editor of the "Modern Hospital," deals in a general way with the hospital field as we find it to-day, and some very striking figures are quoted, showing the rapid progress which has been made in the United States since 1873. In 1873 there were only 149 hospitals in the United States; at the beginning of 1923 there were in the United States and its possessions 7095 hospitals and sanatoriums, with a total patient bed capacity of 792,069. The ratio of hospital beds to the population is very striking; in New York City the actual hospital beds available in January, 1923, was five beds to every 1000 of population. The factors influencing the ratio of beds to the population are fully discussed, and it is noted that there is a very direct bearing between the number of hospital beds required and the housing conditions of the community. In estimating the hospital needs, one might calculate on 75 per cent. of the beds being utilised through the year. Mr. Weber indicates the procedure to be adopted by a board of trustees in the organisation of a hospital, and the various steps to be taken to arrive at the best results. The second volume is by Frank E. Chapman, director, Mount Sinai Hospital, Cleveland, and deals in detail with general administration, laying emphasis on the centralisation of administration. Various diagrams and tables are given showing how this is carried out in different parts of America, and the methods adopted in some hospitals are given in great detail. Many useful hints are given, which are worthy of careful consideration.

THE FACTORY GIRLS' COUNTRY HOLIDAY FUND.

To the Editor of THE LANCET.

SIR,—The committee venture to ask you to allow them to make a very urgent appeal again for subscriptions and donations for the Factory Girls' Country Holiday Fund. Some of those who are hoping to go away during the next few weeks have never slept out of London. Our funds are very low, and we fear that in any case many will be disappointed of their little holiday this summer.

The need for this brief rest and change is probably more urgent than ever before. Trade depression has resulted in the girls becoming the main support of hundreds of families, which but for their earnings would be on the verge of starvation. The general standard of comfort in the average home is lower than it has been for many years, and the health of the community in the crowded and airless factory districts of London has deteriorated considerably. Nor is it possible for the girls to contribute as much towards a holiday as they have done in former years. Good food, rest, and fresh air for a short time would make it possible for many to continue their work through the coming winter, who might otherwise break down under the strain and privation they have had to bear for so many months. The short holiday will give them fresh hope and courage.

Subscriptions and donations will be thankfully received and acknowledged by Miss Canney, 75, Lamb's Conduit-street, W.C. 1.

We are, Sir, yours faithfully,

ALBERTA SANDWICH.
MARY SCHARLIEB.
MARY ST. HELIER.
A. F. LONDIN.
JOHN KENSINGTON.
August 27th, 1925.

FRANK LLOYD.
J. H. HERTZ, Chief Rabbi.
J. F. GREEN, Chairman of the Executive Committee.

HEALTH RESORTS IN GERMANY.

THERE has recently been published in Berlin a large and comprehensive directory, compiled from official sources, of the various spas, watering-places, and health resorts of Germany. The compilers of this *Reichs Bäder Adressbuch* state that the publication is the first of its kind, and as a work of reference the sphere of its utility should be very extensive. The book is, of course, methodically constructed, the resorts being described and illustrated alphabetically in three sections, while an appendix deals with the large towns. A table of resorts grouped geographically follows the preface, and a general index completes the volume. Of particular interest to medical men is the index, in which the spas are grouped according to the disease conditions for which they are specially suited. The cost of the *Adressbuch*, containing 986 quarto pages, is 9.50 Rentenmarks.

MEDICAL MEN AND DEATH CERTIFICATES.

IN the House of Commons recently Sir Gerald Strickland asked the Home Secretary whether he was aware that it was not unusual for certificates of death to be signed by doctors without previously viewing the body after death and on the hearsay evidence of others; and whether he was prepared to propose legislation which would make it incumbent on doctors who signed death certificates to add thereto that they had ascertained to the best of their ability that death had actually occurred and was not merely apparent. This is a very old question, Mr. Neville Chamberlain replied, assuming reference to a certificate which the medical practitioner in attendance on a deceased person in his last illness is required by law to give, "stating to the best of his knowledge and belief the cause of death." He pointed out that the first part of the question gave the present position, but with regard to the latter part of the question he said that the whole subject is under consideration. The matter of death certification has waited for new legislation too long; some term ought to be put to the delay.

CHARTERED SOCIETY OF MASSAGE AND MEDICAL GYMNASTICS.

THIS society has now on its register over 5500 masseurs and masseuses, the majority of whom are qualified to administer treatment by massage, remedial exercises, and medical electricity under medical directions. The society was incorporated by Royal Charter in 1920, and its efforts towards the establishment and maintenance of a careful training in this important ancillary branch of the healing art have done much to secure a worthy place in the ancillary ranks of medicine for the masseur and the masseuse. Admission to the register is obtained by examination. Independent examinations are provided and supervised in London, at various centres in the provinces, in Scotland, and in Ireland, the subjects of examination extending to anatomy, physiology, pathology, massage, remedial exercises, and medical electricity. Many well-known medical men and women, specialists in these subjects, act as examiners, and no member can receive a certificate until a qualified medical practitioner has been satisfied with the candidate's proficiency. The society's register shows that members are now practising throughout the United Kingdom, in the Colonies, and elsewhere. Lists of members practising in any particular district or a copy of the register may be obtained from the secretary of the society, 157, Great Portland-place, London, W. 1.

COUGHING EPIDEMIC IN MILLS.

A MYSTERIOUS epidemic of coughing has broken out among weavers in Burnley mills. It makes them so ill that they have to cease work, and others who have taken their places are similarly affected. Operatives when they return to the mill are again affected. This is the third time such an outbreak has occurred in Burnley mills, the last occurrence being 12 years ago. It has been decided to close the mills for a week, when all suspected apparatus will be removed. In one of the previous outbreaks the cause was believed to be mildew in weft, but it appears that this outbreak was not due to the weft.

CIVIL SERVICE BONUS.

THE Minister of Health announces, on information received from the Lords Commissioners of H.M. Treasury, that the review on Sept. 1st, 1925, of Civil Service bonus will be on the basis of an average cost of living figure of 75, that is, on the same basis as obtained during the six months commencing Sept. 1st, 1924.

MEDICAL EDUCATION IN MISSOURI.

"IF Governor Baker is far-sighted, he will purge Missouri at once of the noisome mess," is the comment of the *Journal* of the American Medical Association on certain curious positions in medical and public relations that have arisen in the State. "Noisome" is hardly too violent an adjective if the suggestions in our contemporary are warranted, for we have stories of money received to influence the Secretary of the State Board of Health, of appointments to the State Penal Board in return for political services given by persons whose records are shadowed by political intrigue, and names are employed throughout. The position reached is, that the Board of Health of the State, having issued an ultimatum that they would resign, are now embarrassed by finding that, if they are loyal to their ultimatum, they will leave the field to the Governor and to one surviving member, when new men can be appointed to cover up the whole situation. The use of strong language by our contemporary appears warranted.